

**From Hippocrates to Bioethics: Tracing Religion's Historical Influence on Scientific
and Medical Advances**

by

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Preface and Acknowledgments:

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Abstract:

This paper will cover the origins of Hippocratic reasoning in medicine and how Hippocrates developed his medical art. It will also follow the history of religion and its influence on science and medical policy. Finally, this thesis seeks to prove the following statement: *Historically, religion's social influences have rendered it a bottleneck for scientific and medical advances. Religious doctrine has functioned as a seeming obstacle to scientific and medical advances, galvanizing public opposition to scientific progress. Despite its impeding qualities, however, religious doctrine functions as a check to unfounded medical and scientific optimism, allowing for gradual public acceptance of verifiable scientific advances.*

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INTRODUCTION:

Hippocrates is best known for the Hippocratic Oath. In it he establishes a set of guidelines for all physicians to honor, and among them stands out the principle of “primum non nocere” - firstly, not to harm. He was the first to set up ethical standards meant to guide physicians and their work. Although Hippocrates wrote these guidelines over two millennia ago, only recently has the field of ethics emerged as an autonomous discipline. It is now a new line of study in medical pedagogy. The field of ethics has expanded beyond the interests of lawmakers and religious representatives to include medical training and practice. The study of ethics in medicine is meant to prepare doctors and instill in their practice a level of humanity. This field is known as bioethics.

These ethical guidelines determine how medicine is practiced, topics of interest, and approaches to research. However, in order to understand the impact ethics has had on the field of medicine, one must trace its influences, origin, and development beginning with Hippocrates. Hippocrates lived in the age of reasoning. As such, he strove to apply reason to the profession of medicine, deviating from the accepted belief that the will of the gods influenced health. At this point, reason and biological causation established a foundation for the field of medicine. However, when the Church took over the local government during the Dark Ages, the ethical aspects of medicine once again came to be governed by religious beliefs. This continued until the Reformation and the French Revolution where the Church began to lose its political power. Thereafter, the Church transitioned from a direct political power to an indirect influential authority to those in power. Today the Church not only influences public opinion, but the

opinions of publicly elected officials such as Congressmen as they make their decisions in controversial issues.

THESIS STATEMENT: *Historically, religion's social influences have rendered it a bottleneck for scientific and medical advances. Religious doctrine has functioned as a seeming obstacle to scientific and medical advances, galvanizing public opposition to scientific progress. Despite its impeding qualities, however, religious doctrine functions as a check to unfounded medical and scientific optimism, allowing for gradual public acceptance of verifiable scientific advances.*

The term bottleneck is taken from population studies of gene pools in species. According to www.nature.com¹, “the population bottleneck produces a decrease in the gene pool of the population... the remaining population faces a higher level of genetic drift. Due to the loss of genetic variation, the new population can become genetically distinct from the original population, which has led to the hypothesis that population bottlenecks can lead to the evolution of new species” The process of bottlenecking scientific advances inadvertently results in the birth of new species, or in this case medical breakthroughs. This thesis attempts to prove that the Church acts as a bottleneck. It does so by preventing specific scientific advances and slowing down medical progress. Bottlenecking occurs when the Church influences public opinion to side against unverified and unethical developments in the medical field. When the Church views an act as unethical it pressures legislature into action. The scientific community reacts to bottlenecking by discovering and establishing new methods that not only avoid ethical problems, but also progress medicine. These new methods are what have been referred to as *unfounded*

¹ <http://www.nature.com/scitable/definition/population-bottleneck-300>

scientific optimism; meaning that without the Church's bottlenecking influence, these new approaches would not have been discovered. Bottlenecking allows the Church to act as a check to scientific breakthroughs, indirectly influencing the birth of new species of medical advances.

CHAPTER I: History and Background: Origins of Hippocratic Reasoning in Medicine

Hippocrates lived in ancient Greece on the island of Kos between the years of 450 B.C. and 380 B.C. Traditionally acknowledged as the Father of Medicine, Hippocrates is best known for bringing order to this scientific field; previously built on superstitions and the oscillating wills of the gods. During this period of Classical Greece², there was a predominant belief in one's potential to be cursed or damned. There also existed, most notably, a universal acceptance in predestination; one of the major motifs in Greek works. Through the use of these motifs, specifically within Greek tragedies, the idea that one cannot escape destiny came to be realized as orthodox. This idea became the tragic flaw, or hubris, that various characters displayed in a myriad of Greek works: one example is that of Oedipus in *Oedipus Tyrannus*, written by Sophocles³. Religions, throughout history, have provided countless etiological answers to mysteries that would otherwise have no explanation. The term etiology refers to the study of how natural phenomena originate. Etiological explanations, through the use of storytelling,

² Classical Greece is marked by the era between the Persian Wars in the fifth century B.C. and by the death of Alexander the Great in 323 B.C.

³ Sophocles was a Greek playwright who lived from 496 B.C. to 406 B.C. and was known for writing Greek tragedies. In his most famous work, *Oedipus Tyrannus*, Oedipus attempts to flee his fate but is ultimately doomed to kill his father and marry his mother as foretold by the oracle.

elaborate on, for example, why there are different seasons in a year⁴ and why snakes have lost their legs and are forced to crawl in the dust on their bellies⁵. Hippocrates was the first to write on medicine by diverging from common etiological superstitions. He lived contemporaneously with Socrates in the age of great philosophical studies and may have been influenced by Socrates and his School of Thought. This school of thought, or rather Ancient Greek philosophy, can be summarized in one word: reasoning. As such, Hippocrates was among the first to see medicine not as a strange art based on magic and ritual healings, but rather based on reason.

The Greeks adopted a pantheon, or system of gods, that was very similar to that of the Ancient Egyptians. Gods were defined for every action and importance in Egyptian life. There existed a god of war, a god of death, a god of the sun, a god of the river Nile, and many others. Herodotus, the Father of History, was among the first to write history in the form of prose, as

⁴ Seasonal changes are explained in the *Homeric Hymn to Demeter*. The hymn centers on Demeter and the rape of her daughter Persephone by Hades. In the story, Persephone must spend a third of every year with Hades in the Underworld. She then spends the remainder of the year with Demeter, her mother. This story attempts to provide an explanation as to why there are different seasons throughout the year.

⁵ This is part of the story of Original Sin in the Christian Bible. Eve is tricked by a serpent and takes a bite of the forbidden fruit. Eve then shares the fruit with Adam and the two are exiled from the Garden of Eden. God also curses the snake. As a result, the snake must crawl on its belly and eat dust (Genesis 3:14).

opposed to poetry, for the sake of historical record-keeping. His aim was to document the story rather than entice feelings or emotions. In his works, Herodotus illustrates the importance of the similarities between the Egyptians and the Greeks. These comparisons serve as a religious ethos⁶ giving authority and history to the gods of the Greeks. Most notable are the comparisons between Zeus and Amon, Osiris and Dionysus, Hermes and Thoth, and Apollo and Horus. Through these comparisons, Herodotus implies that the Greek pantheon has, to an extent, undergone a divine progression, as in the following:

All that have a temple of Zeus of [Thebes](#) or are of the Theban district sacrifice goats, but will not touch sheep. For no gods are worshipped by all Egyptians in common except Isis and Osiris, who they say is Dionysus; these are worshipped by all alike. Those who have a temple of Mendes⁷ or are of the Mendesian district sacrifice sheep, but will not touch goats. The Thebans, and those who by the Theban example will not touch sheep, give the following reason for their ordinance: they say that Heracles wanted very much to see Zeus and that Zeus did not want to be seen by him, but that finally, when Heracles prayed, Zeus contrived to show himself displaying the head and wearing the fleece of a ram which he had flayed and beheaded. It is from this that the Egyptian images of Zeus have a ram's head; and in this, the Egyptians are imitated by the

⁶ Aristotle's appeals on persuasion include: ἦθος ethos (credibility), πάθος pathos (passion), and λόγος logos (reason). Ethos is used to give authority on a subject; pathos entices an emotion or a motivational response from the audience; and logos uses facts or logic to support a claim or an argument.

⁷ Mendes, Greek form of Binded, a town in the Delta where Osiris was worshipped in the form of a ram, according to monuments. Here Mendes apparently means Osiris.

Ammonians, who are colonists from [Egypt](#) and Ethiopia and speak a language compounded of the tongues of both countries. It was from this, I think, that the Ammonians got their name, too; for the Egyptians call Zeus “Amon”. The Thebans, then, consider rams sacred for this reason, and do not sacrifice them. But one day a year, at the festival of Zeus, they cut in pieces and flay a single ram and put the fleece on the image of Zeus, as in the story; then they bring an image of Heracles near it. Having done this, all that are at the temple mourn for the ram, and then bury it in a sacred coffin. - **Herodotus, with an English translation by A. D. Godley. Cambridge. Harvard University Press. 1920. (Herodotus Book 2:42.1-6).**

Here Herodotus explains that the ancient Greeks worshipped the same gods as the ancient Egyptians albeit by different names⁸. Apart from this distinction, the major alterations between versions of their respective gods happen to lie in the characterizations of their physical semblance. Specifically, the gods of the ancient Egyptians were depicted as half-animal whereas the gods of the ancient Greeks were depicted as humanoid. Many of the Egyptian gods were portrayed as therianthropic⁹ beings. Amon had the head of a ram, Anubis had the head of a

⁸ Herodotus uses the word ‘name’. When saying the word name, Herodotus refers to the knowledge of or being of said god. To name the god is to know the god. It does not mean that the name literally comes from Egypt.

⁹ Therianthropy comes from the ancient Greek words for “wild beast” (θηρίον) and “man” (άνθρωπος). A therianthrope is a person who is able to metamorphize into an animal being by means of shapeshifting. It can also be appropriated to the socio-spiritual relation to specific animals. The most common example of this in western lore is that of the werewolf or lycanthrope.

jackal, Horus had the head of a falcon, and Thoth had the head of an ibis, to name but a few. In other words, the Egyptians attributed abilities to certain animals. For example, the falcon was a bird thought to have protective powers. It was also frequently linked to royalty. As such, the therianthrope god with the head of a falcon, Horus, mirrored said attributed abilities. He displayed the same protective powers and was thought to be directly linked to the pharaohs. Herodotus suggests that because of their similarities, Egyptians gods were analogous to Greek gods. Depictions of each respective set of gods differed only in the forms they embodied. He justifies the Greek pantheon by implying that even the Egyptians worshipped them. As stated in the previous block quote: “It is from this that the Egyptian images of Zeus have a ram's head... for the Egyptians call Zeus ‘Amon.’” The Greeks did not copy the Egyptians, instead Herodotus implies that the Egyptians worshipped a premature or lesser version of the same Greek gods. Greeks considered therianthrope individuals lesser beings in relation to their human counterparts¹⁰. From a hierarchical point of view, humanoid gods were considered greater than their therianthrope counterparts, whereas therianthrope gods were above animal gods or idols. This reflects how the Greeks advanced from a society that worshiped according to animal instinct or

¹⁰ This is reflected in the mythical story of the first werewolf, where King Lycaon of Arcadia tricks Zeus into eating human flesh at a banquet. For this crime Zeus punished Lycaon by dehumanizing him and transforming him into a wolf. He now constitutes a different and lesser ontology than that of humans.

reaction,¹¹ into a religion based on reason. To trace this development, one must note when each occurred. The Classical age took place 2.5 millennia ago. It is notable that the ancient Egyptian society developed 2.5 millennia prior to the Classical age. By the age of Classical Greece man had come to realize the importance of the development, understanding, and implementation of reason in everyday life. By worshipping humanoid gods, the Greeks implicitly exhibited the gradual religious development that took place over the ages. This gradual transition occurred between the ages when primitive gods, such as idols and animals, were worshipped, and the age of when Greek gods demonstrated human characteristics. The progression from animal gods, to therianthropic gods, to human gods maps the evolution of deity worship that occurred in the preceding eras. This evolution is the direct result of the emphasis Greeks placed on reason, an ability that only humans were said to have. Whereas animals cannot argue, deliberate, or make choices based on those deliberations, humans have access to this operation. Indeed, it is a skill-set specific to mankind.¹² The Internet Encyclopedia of Philosophy¹³ paraphrases Aristotle

¹¹ Aristotle says that animals do not act based on reason but instead react to stimuli such as hunger or fear.

¹² *Nicomachean Ethics* by Aristotle

¹³ The Internet Encyclopedia of Philosophy (IEP) is a peer-reviewed academic resource <http://www.iep.utm.edu/aristot/>

by stating that “The human soul shares the nutritive element with plants, and the appetitive element with animals, but also has a rational element which is distinctly our own.” In fact, Aristotle expands on this "rational element" claiming that it is the proper function of man to live the active life of the rational being; one who employs or possess λόγος¹⁴ (logos). Speech allows mankind to reason and, as such, it separates mankind from the rest of the animal kingdom.

Although Herodotus demonstrates the importance of reason in justifying Greek mythology, it is highly debated whether or not these Greek thinkers actually believed in the gods of the Greek pantheon at the time. It is important to note that the Greek customs of worship were practiced more in community than on individual personal faith. Any opposing or contradictory beliefs, would be challenged before the democratic community. Hippocrates' thinking may have been influenced by his contemporary, Socrates. Hippocrates incorporates reason into the development of his skill (techne) so as to justify the need for a structured field of medicine. However, he would have made sure not to defy Greek customs and traditions. He would have heard of Socrates' death sentence and trial as a result of his radical ideas and his corruption of the youth. Socrates' Apology¹⁵ was viewed negatively for his disregard for the gods. Because of this, Hippocrates emphasizes his devotion and praise to Asclepius, Apollo, and the gods of

¹⁴ Logos literally means “word” or “story”. It can refer to the ability of speech and therefore the capability of induction and deduction.

¹⁵ Apology is the word used for defense. In his apology, Socrates attempts to defend himself at court.

health. By invoking the gods, Hippocrates justifies his claim to uphold the standards of practice and build upon the field of medicine. In doing, so he satisfies the social requisites while imposing his progressive system. Hippocrates acknowledges social constraints and thereby understands the bottleneck experience¹⁶.

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¹⁶ The term Bottleneck is also used in the scientific study of populations of species.

CHAPTER II: Developing the Medical *Techne* Through Reason

Hippocrates was the first to use observation and reasoning as a means to approach medicine. It was through observation that Hippocrates came to recognize patterns in nature, and through his writings that his students were presented with the opportunities to compare those observations. Many of Hippocrates' books, or works,¹⁷ served as encyclopedias for contemporary physicians. These works were employed so as to not only recognize symptoms and treatments, but also determine how diseases came to be and how their spreading, or recurrence, could be prevented. In addition, Hippocrates incorporated frequent recommendations for both potential patients and students; who would ultimately emerge as the world's future physicians. His works document the evolution of his thought processes, elucidating his conclusions. In the following excerpt, Hippocrates demonstrates the importance of documenting one's findings and of how the process of documentation is advantageous to future generations.

For there are practitioners, some bad and some far otherwise, which, if there had been no such thing as Medicine, and if nothing had been investigated or found out in it, would not have been the case, but all would have been equally unskilled and ignorant of it, and everything concerning the sick would have been directed by chance. - **On Ancient Medicine By Hippocrates, Translated by Francis Adams**

¹⁷ This is also known collectively as the Corpus Hippocraticum.

Hippocrates put a great emphasis on documenting and detailing one's experiences. The idea facilitates the process of learning by allowing emerging physicians access to a corpus of medical experiences through which they not only learn vicariously, as a result of previous physicians' observations, but also put their own practices into perspective. The documentation of these practices is meant to encourage physicians to challenge and repeat prior observations and discoveries. Hippocrates both allows and expects others to build on the skills of those who practiced before them. Rather than have every emerging physician discover the common cold, Hippocrates encourages physicians to learn from their predecessors' experiences and expand upon them through the writing of their own observances. In this manner, physicians enter the field with a foundation and familiarity of diseases and treatments, allowing for more time to explore the knowledge-base of the field. He elaborates on this idea in the following:

But all these requisites belong of old to Medicine, and an origin and way have been found out, by which many and elegant discoveries have been made, during a length of time, and others will yet be found out, - **On Ancient Medicine By Hippocrates, Translated by Francis Adams**

All physicians and scientists build on and expand upon this approach to science. Indeed, today, scientific research strictly abides by the scientific method: a modern approach and "body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge."¹⁸ The documenting of one's work is important to Hippocrates inasmuch as

¹⁸ Goldhaber, A.S & Nieto M.M. (2010, January-March). "Photon and Graviton Mass Limits", Review of Modern Physics.

future generations of physicians are granted the opportunity to replicate and further study their predecessors. These scientific processes ensure the decline of fate, chance, and etiological superstitions as causes for diseases and sicknesses. In other words, Hippocrates' integration of an approach like the scientific method gives reason not to an intangible force, but rather, to a physical reaction. Incorporating this ideology into the culture of science and medicine ensures that its practitioners continually expand, develop, and advance knowledge within the field.

Although Hippocrates stressed the importance of observation and building upon the knowledge of other physicians, he also realized the importance of having the ability to express that knowledge in an understandable manner. His teachings place particular emphasis on the study of diseases and illnesses that common laborers are likely to contract. In order to facilitate access to this information, Hippocrates encourages physicians to write their observations in the vernacular. The relevance of this practice is evident in the following excerpt:

From this it will be manifest that discoveries cannot possibly be made in any other way. And most especially, it appears to me, that whoever treats of this art¹⁹ should treat of things which are familiar to the common people. For nothing else will such a one have to inquire or treat, but of the diseases under which the common people have labored, which diseases and the causes of their origin and departure, their increase and decline, illiterate persons cannot easily find out themselves, but still it is easy for them to understand these things when discovered and expounded by others. - **On Ancient Medicine By Hippocrates, Translated by Francis Adams**

¹⁹ Hippocrates uses the word 'art' to refer to medicine. The word that this derives from means skill or ability.

This concept of understanding what another has "discovered and expounded" upon is undertaken by modern scientists as well. Scientific journals are written primarily for other scientists within a specific field to review and to read. As such, the exchange of information through the register of scientific discourse facilitates communication among practitioners of their profession. However, it was the development and rise of scientific communities that drove leading experts, throughout the ages, to standardize terminology. This in turn established the foundation upon which all future discoveries within a scientific field would be expounded and expanded. One specific example of terminological standardization is the development of the binomial nomenclature system for naming living beings. This system was devised by Linnaeus in his work *Systema Naturae*.²⁰ In this work, Linnaeus categorizes living beings in groups called taxa and assigned each being a Latin or latinized name. This concept was adopted and standardized internationally by the International Commission on Zoological Nomenclature²¹. However, although the medical

²⁰ Carolus Linnaeus lived from 1707 to 1778 and is best known for the 10th edition of his book *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. This is translated from Latin as: System of nature through the three kingdoms of nature, followed by classes, orders, genera and species, by characteristics, differences, similarities, and places. His system is used today in order to classify species by similar traits and that are thought to be related.

²¹ The International Commission on Zoological Nomenclature or ICZN was first established in 1895. It authorized binomial nomenclature as the official policy of naming life in a structured format.

and scientific jargon employed is specific enough to ensure conciseness and clarity for scientists, it holds enough obscurity to remain unintelligible to the common laborer. For this very reason, Hippocrates stresses the importance of the patients' understanding.

In order to fulfill doctors' and patients' needs, both alternate between information-giving and information-seeking. Patients have to impart information about their symptoms, doctors need to actively seek out relevant information. Once the diagnosis and treatment plan has been established, doctors have to efficiently impart this information to their patients. Patients' 'need to know and understand' may lead to additional information-seeking about what has just been told. - **Doctor-Patient Communication: A Review of the Literature. Journal of Social Science and Medicine**

This article stresses a point that has, in recent decades, peaked the interest of medical communities worldwide. It indicates the communicative difficulties that arise during the physician-patient interaction. Not only is there a need for the physician to maintain a good inter-personal relationship with his or her patient, but also to ensure that the physician-patient interaction encourages enough of an exchange of information so as to support treatment related decisions. As such, a physician ought to convey interest, be friendly, be honest, have a desire to help, show devotion to the task at hand, have a non-judgemental attitude, and an appropriate social orientation²². Both patient and physician should strive to achieve an open dialogue and

²² Social orientation is a social psychological term that refers to a person's motives when doing an act. Is the outcome benefiting oneself or benefiting another. Does it hurt oneself or another? This is what defines the difference between sadism, masochism, altruism, and individualism. A

candidly exchange information as a means to attain a better understanding of the medical condition. Not immune to the influences of technological and scientific advances, modern physician-patient interactions have transformed into fact-filled physician-led lectures. In an attempt to improve the efficiency of dialogue, the medical field has revisited one of the founding principles of the Corpus Hippocratum, specifically communicative clarity. In his work, *On Ancient Medicine*, Hippocrates states: “[But] whoever does not reach the capacity of the illiterate vulgar and fails to make them listen to him, misses his mark.” In other words, a physician who fails to have himself understood by his patient, accomplishes nothing. Francis Adams' translation is realized through the use of the Attic Greek word ἄμαρτία, meaning “to miss the mark.” However, a common, or Koine,²³ Greek interpretation of the same word, ἄμαρτία, would render a translation meaning “to sin.” Doing so transforms the secular function of the physician into a religious obligation. For a physician to fail in his communicative duties is not only “to miss the mark”, but “to sin” and practice unethically as well. The ethicality of ensuring patients' informed decisions is the reason why modern medicine has emphasized the importance of proper communication and patient understanding. Although patient dissatisfaction continues to derive

physician's duty would be defined as cooperative or prosocial which falls between altruism, and individualism.

²³ Kione Greek, or common Greek, is used in the writing of the New Testament in a later time period than that of Attic Greek. Kione Greek should not be confused with Modern Greek.

from physician explanations, it is no longer due to a lack of clarity but rather of relevance. Ong illustrates this point in the following:

Much of cancer patients' dissatisfaction with the exchange of information stems from a lack of concordance between the perceptions of patients and doctors. When informing cancer patients about their disease, doctors may define medical information objectively (type of disease, its stage, type of treatment) while patients define it in terms of its personal relevance (will I fully recover? how much pain will I have?). As a result, the physician may feel he has given precise and relevant information, the patient on the other hand may feel he has learned nothing new. - **Doctor-Patient Communication: A Review of the Literature**

In order to improve physician-patient communication, every exchange of information should take place in the common vernacular, and not in a sophisticated medical register. Hippocrates urges physicians to write their findings in the vernacular so that persons, or rather patients, receiving medical information can understand. Ultimately, the goal is for both the patient and the physician to arrive at a mutually intelligible position. To do so, the medical information that comprises the content of the patient's circumstance must be explained by the physician in an appropriate and relevant context. Though physicians may understand the details and intricacies of a given sickness, more often than not, patients' attention and focus dwells on the process of recuperation. Whereas physicians tend to remain objective in their explanations, patients are subjective in their experiences. Hippocrates encourages his fellow physicians to strive to understand this subjective approach and apply it to their practices accordingly. To do so is to employ the principle of beneficence with versatility: adapting the paternalistic physician-patient relationships that currently exist to more subjective interactions, which are preferred by patients. This type of communicative approach allows physicians to ensure that not only have the patients' interests been addressed, but that physicians' medical obligations and ethical responsibilities

have been satisfied as well. The importance of maintaining a subjective approach to communicative clarity, in physician-patient interactions, becomes evident when one takes into consideration the modern principle of patient autonomy. However, though modern medicine has attempted to improve communicative clarity by revisiting Hippocrates's founding principles, the application of these principles has been inhibited by ethical and legislative constraints. As such, physicians' medical and ethical duties can, at times, be overruled by patients whose belief systems contradict recommended protocol. This predominantly occurs when treating patients with health-care proxies, living wills, or advanced directives. From an ethical standpoint, any of the previously stated legal documents may represent the autonomous wishes of an individual or patient. Ultimately, decisions are influenced by the patients' belief systems, whether or not they are religious. In order to practice ethically, physicians must ensure that their patients' decisions, which guide medical treatments, are made with knowledge of probable risks. One example is the potential need for blood transfusions during routine surgical operations. Surgical consent forms, which must be explained to the patient prior to signing, must explicitly state the name of the procedure, risks, benefits, and probable necessities in the operating room; such as the previously stated likelihood or need for blood transfusions. Continuing with this example, patients who refuse to consent to potential blood transfusions, against medical advice, may proceed with their operation only if the provider decides that the benefits of the procedure outweigh the risks. In such situations, communicative efficiency is of paramount importance. Its effective use ensures that patients not only understand the risks and benefits of medical recommendations, but that they also have the necessary knowledge to make informed decisions to the contrary. In this manner, physicians practice beneficence with respect to patient autonomy. Nevertheless,

sophisticated medical register remains the jargon of choice for medical-legal transactions which include informed surgical consent. Consequently, the essence of Hippocrates's guidelines is mirrored in the ethical aspects of the aforementioned modern medical practices; which are both supported and legitimized by the governance of legislative policies.

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CHAPTER III: Religious influence on medical policy: a historical perspective.

Religious institutions have had substantial influences on the healing arts throughout history. Science now moves or attempts to move from a religious background to a sacrilegious one. However Hippocrates, just like Socrates, may have been ahead of his time. He is forced by his society to recognize, although contradictory to his discipline, that all events are results or wishes of the gods, and that the only way of overcoming these events or perceived divine punishments, is by appealing to the gods. However, after the passing of Classical Greece came the rise and fall of Rome. The Romans, who had adopted the Greek gods as their own, continued the pagan practices until the Roman emperor Constantine converted to Christianity at the Battle of Milvian Bridge²⁴. In his famous theophany, Constantine is delivered a message from God written in the sky. Today this is commonly remembered by the Latin dictum, "*In hoc signo vinces*"²⁵ which is translated to "By this sign you will conquer." He was the first Christian

²⁴ When Emperor Diocletian abdicated his throne, war broke out over who would be his rightful successor. In the Battle of Milvian Bridge, which took place on October 28, 312, Constantine faces Maxentius, another contender for emperor, in war for the seat of emperor. The story is recounted by Eusebius of Caesarea in his panegyric, *Βίος Μεγάλου Κωνσταντίνου* (Bios Megalou Constantino) or *Life of Constantine the Great*.

²⁵ The phrase was actually originally written in Greek ἐν τούτῳ νικά (en touto nika) meaning "in this sign, conquer!" However, its Latin form was made popular and remembered in Western

emperor and brought about the Edict of Milan,²⁶ which made Christianity officially a legal religion in the Roman empire. Prior to this edict was the Great Christian Persecutions or the Age of Martyrs. It should be noted that though Constantine converted, he did not do so to gain political favor. Once he did so, everyone's conversion followed, so as to be in favor of the emperor. Because of this Christianity grew in popularity.

In the year 410 A.D. Rome had been sacked by the Visigoths, a Germanic tribe. Many treasures were robbed and buildings destroyed. However, the important implication from this event is that life, as the Romans had known it, ceased. As a result of the constant raids and defeats, life in the empire reverted from large cities and conquest back to small towns. The large aqueducts that the Romans had built for baths and fresh water were taken apart as quarries so that houses could be built. These and other structures were no longer sustainable. The lack of sewer usage made disposal of garbage difficult. As a result, all hygienic tendencies supported by the Roman waterways throughout the empire ceased. People once again built a reliance on still

history. The sign that is mentioned is the Chi-Rho () a symbol that is commonly

synonymous

with the cross. It is a monogram of the Greek letters Chi χ and Rho ρ which are the first two letters of the Greek word Χριστός (Christos) meaning the “anointed one.”

²⁶ The Edict of Milan took place in the year 313 and was important in Christian history since it marked the beginnings of Christian tolerance in Europe.

water, such as wells, for potable water. This easily allowed for contractions of diseases and illnesses. The lack of a stable government body gave rise to social disorder and war which in turn, disrupted communication and learning. This series of downspiriling events resulted in an age of social disadvantages known as the Dark Ages²⁷.

The next to rise in political power would be reagents that participated in tribal wars. Clovis²⁸ united the Frankish tribes and used the ethos of the Catholic Church as his form of cultural authority to not only unite his subjects in religion but also to unite his warriors for a cause. The Roman Catholic Church served as a form of not only religious order but also political power. With one religion it was easier to unite the peoples. The regions that he conquered were mainly part of Gaul²⁹ which had belonged to the Roman Empire for hundreds of years. He started the first holy wars as an excuse for extending his kingdom on the basis of religion in order to expand the Roman Catholic Church. Clovis put into effect the Salic Laws which

²⁷ Petrarch was the one who called this era, after the fall of Rome, the Dark Ages because it came after the brilliant Classical age.

²⁸ Clovis lived from the year 466 A.D. to 511 A.D. He was the head of the Frankish kingdom and the first of the Merovingian dynasty.

²⁹ Gaul is modern day France. Julius Caesar was made famous after his military victories over Gaul. Clovis I is the first king to ally himself with the Church in post Roman era. He can be directly compared with Constantine in this sense.

consisted of customary law, Roman written law, Christian ideals, and royal edicts. This was the first major instance where the Church was used for a political agenda. Later the church itself would hold political ideals which it would enforce in Catholic lands.

This new role of the Roman Catholic Church as a source of political power had slowly developed after the death of Jesus. Jesus himself was not a political figure, although he was often called Savior, Messiah, or Son of God by the Jews. He did not want to be the center of anti-Roman opposition. The Jews wanted Jesus to be the second Moses. Just as Moses had freed the Jews from the Egyptians, the Jews wanted Jesus to free them from their Roman oppressors. He is not, however, Jesus the revolutionary of Liberation Theology.

After the people saw the miraculous sign that Jesus did, they began to say, 'Surely this is the Prophet who is to come into the world.' Jesus, knowing that they intended to come and make him king by force, withdrew again to a mountain by himself. **(John 6:14-15)**.

Jesus included people of different political persuasions among his disciples. The majority of the Jews were opposed to Roman rule, yet Matthew, a Roman sympathiser because he was a tax collector, was accepted by Jesus. Jesus was not a political figure, as he has frequently been depicted throughout history, and most recently in the thought of the Liberation-Theology movement in Latin America in the last quarter of the 20th century.

The ancestors of Charlemagne came to power during the Moorish invasion of Gaul which was launched from Arab Spain. Assuming the title of the "Defenders of Christendom," Charlemagne's family, set the precedent for their most famous relative's celebrated act of obedience. On Christmas day 800 A.D., Charlemagne, the founder of the Carolingian Empire, was to bind the people of Europe to their Church more than ever before. Already a king at this

time, Charlemagne bowed down to Pope Leo-III, once again linking faith with politics in a bond that would not be broken until the French Revolution in 1787. Lands would follow local law but now everyone would obey canon law including the kings. The pope, who is God's representative on Earth henceforth named the kings as rulers by the grace of God. The Catholic monarchies were "Mandates of Heaven," and the social system imposed represented the Church's understanding of the hierarchy of powers, from highest to lowest: God, the Pope, the king, the aristocracy, and the common people. This hierarchy was further refined into the Estates, which in order of seniority were the clergy, the aristocracy, and the common people (often referred to as "peons"). This feudal system was supported by the Church and was not challenged until the French Revolution and the Declaration of the Rights of Man.

Saint Augustine of Hippo who lived in the late 300s developed the concept of the embodied spirit. He was of the first to write on philosophical anthropology giving importance not only to the soul but also to the body. This is exemplified by Catholic opposition to the desecration of the human body *post mortem*. Building upon the previous works of Classical Antiquity, which had based their findings on the dissections of mammals, Andreas Vesalius (1514-1564) wrote his celebrated *De humani corporis fabrica libri septem*, in which he documented new findings about the human body that had been derived through the dissection of human bodies themselves.³⁰ It was one of the most influential works to be written and in it Vesalius named various parts of the human body along with their structure, function, and pathology. Critic Rifken explains that: "[He] also included anecdotes about his own

³⁰ The title is translated to: "On the fabric of the human body in seven books."

grave-robbing and dissection experiences.” This scientific work brought Vesalius fame, and led to his becoming the official physician and apothecary of Charles V, Emperor of the Holy Roman Empire. He swayed away from the accepted medicinal practices of Galen which were developed from mammalian dissections. Vesalius corrected medical inaccuracies, especially anatomical misperceptions. Debunking primitive medical concepts such as the four humors, Vesalius followed Hippocrates's formula of testing and building upon the medical experiences of earlier physicians, which had been based on rational observation.

Leonardo da Vinci (1452-1519) is example of an artist who studied cadavers and then drew them. The main difference between Vesalius and Da Vinci was that the latter was not a physician and therefore was doing something illegal by dissecting cadavers. In the spirit of the Renaissance, however, Leonardo's outstanding ability to document anatomical features through his artistic illustrations served as a valuable resource for physicians' studies.

Herophilus (335-280 B.C.) studied at Kos 60 years after the death of Hippocrates. He along with his contemporary Erasistratus (304-250 B.C.) helped develop understandings of both anatomy and physiology respectfully. Anatomy pertains to the structure while physiology focuses on the function of each organ. They would perform public vivisection of prisoners sent to them. Aulus Cornelius Celsus (25 B.C. - 50 A.D.) was a Roman encyclopedist whose major work was *De Medicina* wrote:

Moreover, since both pains and various types of diseases arise in the internal parts, they [scil. the "Rationalists"] think that no one who is ignorant of these parts can apply remedies to them. It therefore is necessary to dissect the bodies of the dead and to examine their viscera and intestines. Herophilus and Erasistratus, they say, did this in the best way by far when they cut open people who were alive, criminals out of prison, received from kings. And while breath still remained in these criminals, they inspected those parts which nature previously had concealed, also their position, color, shape, size, arrangement, hardness, softness, smoothness, connection, and the projections and depressions of each, and whether anything is inserted into another thing or receives a part of another into itself. For, they say, when pain occurs internally, it is impossible for one who has not learned in which part each

internal organ or intestine lies, to know what hurts the patient. Nor can that part which is ill be treated by one who does not know what it is. And when a person's viscera are exposed by a wound, one who does not know the color of an [internal] part in its healthy state, cannot recognize which part is intact and which damaged; thus he cannot even come to the aid of the damaged parts. External remedies also can be applied more suitably by people acquainted with the positions, shapes, and size of the internal parts... . Nor is it cruel, as most people maintain, that remedies for innocent people of all times should be sought in the sacrifice of people guilty of crimes, and of only a few such people at that. ([Neurosurgical Focus](#) **The Journey of Discovering Skull Base Anatomy in Ancient Egypt and the Special Influence of Alexandria** by Ali M. Elhadi, M.D., Samuel Kalb, M.D., Luis Perez-Orribo, M.D., Andrew S. Little, M.D., Robert F. Spetzler, M.D., Mark C. Preul, M.D.)

Vivisections, or live dissections of criminals were not considered unethical, although some people thought it cruel. The Nazis under the Nuremberg trials conducted similar tests on live human specimens. With Herophilus and Erasistratus vivisections were used as a means to gain knowledge with respect to human life, whereas in the Nazis' case, cruelty was used to beget more cruelty and test the limits of the human body. Galen (129-199 A.D.) founded the importance of the brain and its function of being the source of all nerves. He said, "If you press so much upon a cerebral ventricle that you wound it, immediately the living being will be without movement and sensation, without spirit and voice." In Galen's time human dissections were once again outlawed. He learned his studies by dissecting apes, pigs, and other mammals. Many of his works were translated from Greek into Latin, Arabic, and Hebrew and therefore were made popular throughout the world and lasted until the 17th and 18th centuries. During the great fires of Alexandria in the 1st and 7th centuries many medical books were lost. The Arabic translations however survived and were built upon in the Middle East and eventually made full circle with the writings of Avicenna (980-1037) and the revival of the Renaissance.

According to Lassek in his work *Human Dissection: its drama and struggle*, "The one thing that was needed was legal permission to dissect human material and this had to come from

the all-powerful Church which was temporal as well as ecclesiastical.” The church ruled not only the spiritual realm, but also the physical realm. Many medics were monastics or clergy who both studied the art and had permission of dissection from their superiors. The Middle Ages brought with it the rise of the first medical universities among them the University of Salerno and the University of Bologna. Mondino de Luzzi (1276-1326) known as the Restorer of Anatomy, was the first to perform human dissection since the times of the Greeks. It was held publicly and according to Lassek, “the proceeding had the blessings of the Pope.” However, demand of bodies was high and the supply of cadavers was low at these schools so students began to rob graves of criminals in cemeteries. Pope Sixtus-IV (1414-1484), who had been a student at Padua and Bologna, and Pope Clement-VII (1478-1534) both allowed human dissections. Lassek add, “In 1410, the city of Bologna assumed the burden of paying the salary of professors; this inaugurated official control of certain universities by the Italian states.” Learned laymen are those who are in charge, as opposed to the clergy. The Church, by establishing schools, created a system of education. Some of these institutions were allotted to the state and became public. The government's acquisition of these institutions was facilitated by the Church's pre-established structures. As such, the government took charge of education. The complete fall of the Church's influence over politics comes in the Reformation and the French Revolution.

Galileo's is one of the most notable case of where the Church uses its political power to silence an individual. Galileo Galilei (1564-1642) was an astronomer who lived in a period where there existed three distinct astronomical theories. The Aristotelian/Ptolemaic system had everything orbiting around a stationary Earth, known today as the geocentric system. The

Tychonic system (developed by Tycho Brahe) had the Earth as stationary, however, the Sun went around the Earth and everything else went around the Sun. After Galileo's presentations in 1611, this became the favoured model of the Roman Catholic Church. Most Jesuit astronomers (such as Clavius) had adopted this system by 1620. The Copernican³¹ system had a stationary Sun around which everything else revolved, known today as the heliocentric system. Galileo insisted that the planets orbit the sun in a circular motion. This was contrary to the theories of Johannes Kepler, who proposed in his *Astronomia nova* (1609) that planetary orbits are elliptical. Galileo stated that the tides were proof of the Earth moving. The Church responded to Copernicus' theorem "if there were proof that the earth circles around the sun, then we should have to proceed with great circumspection in explaining passages of Scripture which appear to teach the contrary." However, Galileo had much opposition in the scientific community. He delved into the theological realm reciting arguments made by St Augustine and Thomas Aquinas regarding Biblical interpretation. This is ideally why the Church was forced to stop him. They allowed him to do his scientific theories as long as they stayed scientific. Pope Urban-VIII a friend of Galileo and believer of the Aristotelian system challenged Galileo to include the Aristotelian alternative in his presentations of the universe for comparison. 'In 1632, Galileo published his response to these arguments: *Dialogue Concerning the Two Chief World Systems*. In it, he presented his astronomical theories as a conversation between Salviati, who is referred to as 'the Academician' and represents Galileo's own views; and Simplicio (or 'The Fool'), who

³¹ He was Catholic priest and is best known for writing: *De revolutionibus orbium coelestium* in 1543

bumbles about and contradicts himself as he ineptly offers a straw-man version of the Aristotelian / Ptolemaic perspective – and, more importantly, represents the Pope’s views.’ He offends the Pope and is convicted of heresy. Contrary to popular belief, he was not tortured or killed. Instead he was placed under house arrest ‘in a luxurious apartment overlooking the Vatican gardens.’

The four pillars of modern medical ethics are: Autonomy, Nonmaleficence, Beneficence, and Justice. Rather than the greek style of observation, documentation, and observation the Nazi physicians during WWII did tests to see the limits of the human body. It was not to observe sickness but to induce illness and observe symptoms. This is no longer research for the sake of beneficence. There was definitely no autonomy for these WWII victims, nonmaleficence was not observed, and these acts were far from just. The Nuremberg Trials brought the birth of modern bioethics which is governed by local legislation. In a world of science and law is religion still influential in any negative way? Those politicians who are in charge who, for example, that interpret the bible literally are misusing both religion and legislature. When there is an imbalance of Faith and Religion, views on certain topics can become distorted.

- end ch 3 -

CHAPTER IV: Catholicism and its influence on science: Does reason counteract Faith?

In tracing the political history of the church, the dichotomous actions of ecclesiastical rule and its influences over scientific advances become apparent. Whereas the structural organization of the Roman Catholic Church facilitated the institutional advancement of scientific and medical studies, the impeding functions of canonical dogma have prevented physical sciences from diverging into the realm of spiritual doctrine. Through analysis of the church's influential history, one may postulate that religion, as faith, serves as the antithesis of science, or reason. However, this remains inconsistent with the contemporary Roman Catholic stance which assesses the antithetical aspects of faith. Pope John Paul-II addresses this issue in *Fides et Ratio*, alluding to faith as a necessary component for those who both, long for a comprehensive understanding of the church, and wish to fully live as a human being. In his words: "Faith and reason are like two wings on which the human spirit rises to the contemplation of truth; and God has placed in the human heart a desire to know truth - in a word, to know Himself - so that, by knowing and loving God, men and women may also come to the fullness of truth about themselves." Overreliance on either faith or reason imparts corrupted views on religion and science respectively. Whereas having too much faith may lead one to act blindly, a lack of faith may give rise to immoral and unethical actions. The main differences between the two is that religion responds to ultimate mystery and seeks answers to ultimate questions of identity and destiny: Who am I? Where have I come from and where am I going? Why is there suffering and evil? What is the meaning of life? What is the point of living? Does it make any difference whether I do good or bad deeds? Is there reason to hope? What is there after this life? Religion

looks for the ultimate basis of reality - truth, beauty, goodness - that we may pursue and live out transcendent values that transform ourselves and our life or world. Science responds to created reality. It investigates finite reality in its infinite web of relationships in order to understand their operations and forces, to control and harness them, to find solutions to the problems that arise because of them.

Charles Darwin and his Theory of Natural Selection is controversial in the eyes of the Church because it deviates from the geocentric belief. The geocentric belief is not limited to the position that the sun revolves around the earth. It also implies that man is the center of the universe or natural world otherwise known as the anthropocentric model. The human nobility alluding to being created in the *imago Dei*³² is challenged by the descent of man which ties human lineage to that of apes.³³ Darwin's theory suggests that nature follows sets of laws and systems meaning human beings are no better than other animals. The idea can describe the physical realm but has no place in the theological realm. Neo-Darwinists imply that God has no influence on the world, something that cannot be proven scientifically and goes against the theological teachings of the church.

When we read in Genesis the account of Creation, we risk imagining God as a magus, with a magic wand able to make everything. But that is not so.

³² *Imago Dei*, "The image of God", is a doctrine of the Catholic Church that stems from Genesis 1:27: "God created man in his own image."

³³ Refer to Chapter I for more on the differences between humans and animals in theological and philosophical aspects.

He created beings and allowed them to develop according to the internal laws that He gave to each one, so that they were able to develop and arrive at their fullness of being. ... And so creation continued for centuries and centuries, millennia and millennia, until it became which we know today, precisely because God is not a demiurge or conjurer, but the Creator who gives being to all things. The beginning of the world is not the work of chaos that owes its origin to another, but derives directly from a supreme Origin that creates out of love. The Big Bang, which nowadays is posited as the origin of the world, does not contradict the divine act of creating, but rather requires it. The evolution of nature does not contrast with the notion of Creation, as evolution presupposes the creation of beings that evolve. **Francis in the Pontifical Academy of Sciences, 27 October 2014**

If science wants to disprove religion they can ask for the proof of the origin story or simply point out that there are two origin stories in the bible. However, just like how Pope John Paul-II said, “The Book of Genesis does not tell us how heaven was created, but rather how we can go to heaven!” Here the pope emphasizes the etiological significance of the creation stories rather than them being actual historical events. An arising proposal of how history is orchestrated, according to certain theologians, follows what is called an intelligent design. This takes into account emergent probability. Emergent probability is the term Lonergan gave to his account of world process, an account that seeks to explain both the regularities of systems and the probabilities arising from non-systematic aspects of the world. Nature might follow select systems and laws, but they are also subject to statistical laws of probability. Here the ‘will of God’ comes back to importance.³⁴ What are the chances that the sperm cell meet the egg cell

³⁴ The will of the gods comes back to play here, however, it is not in form of illnesses, curses, or destiny as stated in Chapter I. Religion here uses the science of probability or chance to

every time two people sleep together? It was God's will that said person was begotten. Just because it follows certain natural laws doesn't mean that there is no intelligent design.

The beginning of the gospel of John parallels the beginning of the first book of the Old Testament. According to John 1:1, "In the beginning was the Word. The word was with God and the Word was God. He was with God in the beginning." It is to show the importance of the word (logos) or the ability to reason. It serves to reintroduce the importance of speech, one of the main functions of Jesus in the New Testament - evangelism. In fact, it is often cited that Jesus is the word made flesh. This creation story is the first one written in order of the book of Genesis, however, it is actually the second one written chronologically. The Church recognizes the need for logos or reason and incorporates it into its dogma. This is not only done with logical reasoning of theological and philosophical questions, but also in the concept of *imago Dei* which explains why only man as opposed to other animals is able to reason.

The Church was not against science. In fact many of the scientists were either clergy or a layman that the church was often the benefactor for. Gregor Mendel, an Augustinian monk, postulated laws of heredity by studying inheritance in pea plants. Copernicus, Galileo, and Newton all made important finds or breakthroughs that disagreed with the common thought of the masses in their respective eras. The world may be 'molecules in motion,' but we certainly do not experience it in this way through the senses. The world is made of that which we can experience, known as phenomena, and of that which we do not experience, known as the

emphasize that nature is more than just systems. Instead this chance is influenced by Intelligent Design.

noumena. Phenomena is how the world appears to us or to the conscious. Noumena is the world as it is outside of our abilities of sensation. The world experienced is not the world in itself.

Kant says, “Two things fill the mind with ever new and increasing admiration and awe... the starry heavens above and the moral law within.” Here Kant refers to the “starry heavens” as the determined scientific laws of nature. The science that is observed and practiced is determined in that it is not ‘free.’ There are no choices, science follows strict laws that are set. An apple does not choose to fall from the tree, it falls because of Earth’s gravitational pull on the apple.

However, human beings are not deterministic and cannot be mechanically described. Rather, man has the ability to reason, make choices and deliberate. In other words man is not predictable and cannot be looked at the same way science is looked at. Kant’s deontology instead demonstrates how a person ought to act. It is a person’s duty to act to treat people as ends in themselves, never as a means to an end. This goes along with the modern practice of beneficence and is what the Nazi physicians disregarded in their tests of the limits of the human body. This duty can be seen as a guideline, or as ethics, and is known as the theory of human practices. Religion therefore as an institution acts as this guideline of human practices and this is extended in political laws.

Kant’s use of human practices is important in the development of modern bioethics. Physicians are not to look at a patient and use them as guinea pigs so that they may try new techniques. This ideally should only be done if all other plans fail. Developing or testing new techniques is important but the human life should be the physician’s main priority. It is not the action by which the physician should be judged but by the intention. Is it done with beneficence

or is it done to test a new drug or technique? Is the physician trying to care for the patient or is he testing new theories.

Descartes addresses the faults of empiricism when sensory evidence is not sufficient. These 'adventitious' ideas come from the sensory world, but that does not keep them from also being factitious ideas. From sensory evidence alone, it appears that the sun rises from the east and sets in the west. In common language this is known as the sun rising and setting. However, the Copernican Revolution showed that this is not so. The universe is not geocentric but heliocentric. The sun does not revolve around the Earth. The Earth revolves around the sun. Observations should be reasoned and not forced to prove something else.

like those subjects which are occult and dubious, in attempting to handle which it is necessary to use some hypothesis; as, for example, with regard to things above us and things below the earth; if any one should treat of these and undertake to declare how they are constituted, the reader or hearer could not find out, whether what is delivered be true or false; for there is nothing which can be referred to in order to discover the truth. - **On Ancient Medicine By Hippocrates, Translated by Francis Adams**

Here Hippocrates states that one cannot simply believe or follow something just because of what others say. Reason is needed for any truth to be accepted. Geocentrism can be easily confirmed by what we see or understand from our senses. The sun rises and sets. However, empirical evidence is limited by technological advances. Robert Hooke would not have discovered the cell

if it were not for the microscope.³⁵ Once science transverses the senses one has to be able to enhance the senses. Telescopes and microscopes allowed for these discoveries to occur. Technological and the scientific advances have had a profound impact and influence on the practice of medicine. However, hypotheses and theories are developed when technology has not yet caught up to rational thinking or when technology is not necessary as in the case of mathematical theorems.

St. Anselm coined the Latin dictum *fides quaerens intellectum* or “faith seeking understanding.” It is easily summed up in the following: *Neque enim quaero intelligere ut credam, sed credo ut intelligam* translated as “I do not seek to understand in order that I may believe, but rather, I believe in order that I may understand.” Faith comes before reason in importance according to Anselm in his *Proslogion*. According to Guretzki and Nordling, “For Anselm, matters of religion and theology are understood only by first believing them and then proceeding to gain an intellectual understanding of the things already believed. In other words, faith is both logically and chronologically prior to reason.”³⁶ Reason comes with time as discoveries are made. It takes time for both the masses and the Church as an institution to

³⁵ Robert Hooke’s book *Micrographia* was an introduction to the microscope and its possible uses. Robert Hooke is known for his discovery of the cell. He came upon it from studying plants under a microscope.

³⁶ Stanley J. Grenz, David Guretzki & Cherith Fee Nordling, [*Pocket Dictionary of Theological Terms*](#) (Downers Grove, IL: InterVarsity Press, 1999), p. 52

review and accept scientific advances. The Big Bang Theory and the Theory of Evolution are both scientific theories that have been recently re-evaluated by the Church. Pope Francis was the one to say the God is not a magus or a demiurge that waves a magic wand. In other words, Creation agrees with both the Big Bang Theory and the Theory of Evolution.

- end ch 4 -

CONCLUSION: Abortion, Euthanasia, and embryonic stem cells. Is it allowed for Hippocrates??

There are many controversies relating to the Hippocratic Oath that are simply misunderstood. These include: the Invocation, Surgery, Euthanasia, and Abortion. When Hippocrates says: “I swear by Apollo, the Physician, and Asclepius and Hygieia and Panacea and all the gods and goddesses, making them my witnesses, that I will fulfill according to my ability and judgment this oath and this covenant,” he is calling to the Greek community to not allow what happened to Socrates to happen to him. Hippocrates is referencing the death of Socrates in this line and is also following the social norms of beginning a work with an invocation to the gods. He knew that he would have to first thank the gods for giving him the inspiration and ability to work through them. He cannot outrightly say that the gods are not involved in or able to be observed in biological causation. Invoking the gods gives him a cultural authority that allows others to accept his deviant practices.

In his Oath Hippocrates says: “I will neither give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.” First he states that he and his practitioners are against the act of euthanasia. A physician ought not to kill on purpose nor prescribe something that would kill a patient. It is not a moral issue however. Hippocrates says “In purity and holiness I will guard my life and my art.” He does not say he will guard the life of the patient. His issue is with the way a physician ought to be portrayed, not if it is ethically correct to kill someone who is in pain. This vocation is to be a noble art. It will not be

associated with causing death or assassinations. If someone had a political enemy he or she wanted to get rid of he could easily get a mortal concoction from the closest physician and have his enemy killed. Abortion is looked at similarly in this case. Both involve the death of an innocent being. At the time it was believed that the woman's womb was only a garden where the seed would grow. In other words, children came solely from the man, but developed inside the woman from where the child would be begotten. Both abortion and the act of euthanasia were popular among the common people in the Classical Age. However, Hippocrates did not want to associate himself or his art with these ill deeds. He cautions physicians that by giving the woman an abortion, the physicians would make enemies with the fathers of the unborn children. By doing this they could take away the potential heir to a family name or dynasty. Instead he instructs physicians to leave these ill deeds to midwives who know all about giving birth and ways of preventing pregnancies. The status of the physician should not be tarnished by euthanasia or abortion. Today it could be compared to not doing these things because of legal actions. Hippocrates does not want himself or his students to be put to trial. In a world where democracy rules Hippocrates recognized that he would be contradicting the beliefs of the common person and that could prove difficult. He does not want physicians to be involved in difficult situations or to be persecuted by the law. Within the next thousand years religion, specifically Catholicism, becomes the governing body in the Western world. In the modern age, religion still acts as an authority in terms of ethics for deciding whether something is right or wrong. As religious congressmen adjust the legislature the Church acts as the bottleneck.

One of the major misconceptions of the Hippocratic Oath is on surgery and whether or not it should be done on a patient. The oath says: "I will not use the knife, not even on sufferers

from stone, but will withdraw in favor of such men as are engaged in this work.” If this excerpt is closely read one would understand that Hippocrates' implications; that a professional stick to his specialty. Physicians specialize in different areas of medicine. An ethical professional knows when a medical condition is out of his range of expertise. For example, a dermatologist should not attempt to perform brain surgery on his patient. An ethical physician would know when and how to make an appropriate referral. The following excerpt from The Examining Room expands on the need for a physician to stay within his scope of practice:

While many have inaccurately claimed that this passage disallows surgery, it more accurately instructs the physician to practice within acceptable boundaries of training. As a family doctor I should not be in the operating room attempting a transsphenoidal hypophysectomy, nor should a neurosurgeon try to juggle the patient with diabetes, coronary artery disease, dementia, Parkinson's Disease, arthritis, idiopathic thrombocytopenia, history of three strokes, peripheral vascular disease, smoking, adrenal adenoma, insomnia, venous insufficiency, breast cancer, and gallstones (I don't know how you do it, Mrs. X). “Sufferers from stone” may have been suffering kidney or gallbladder stones, the pain of which could certainly drive some mad enough to demand their physician just start cutting.

My thesis statement argues that the Church has stopped scientific advancements. However, by doing this the Church has allowed for time for those advancements to be verified. With more time, the Church is presented with ample opportunity to weigh the ethicality of scientific advances. If deemed unethical, in the eyes of the Church, it may sway public opinion on why said advances should be stopped. This may entice changes in legislature to allow or disallow the said practices. The response that science has shown has been to attempt to find new ways of doing these same scientific advances without acting unethically. A great example can be seen in

the use of Human Embryonic Stem Cells (hES cells). These cells, which are progenitor cells in nature, serve to aid in many studies relating to regenerative medicine. However, the Church recognizes the process of obtaining these hES cells as abortion. It is not only a sin to kill a human being, but it is also against the law. This is where there is a clear dichotomy between Church and State. The Church says human life begins at conception but local legislatures' opinions vary.

When an egg cell and sperm cell come together they fuse to make a cell with 23 pairs of chromosomes. This zygote then develops into a blastocyst. In this blastocyst there is a culmination which is called the Inner Cell Mass (ICM). This ICM is where scientists collect the hES cells. These cells have the ability to differentiate into any cell that the human body will eventually make. This includes: lung cells, thyroid cells, pancreatic cells (and others of the endoderm), smooth muscle cells, skeletal muscle cells, red blood cells (and others of the mesoderm), skin cells, neural cells (and others of the ectoderm), in other words every type of cell that the human person can produce in a lifetime. But why does the Catholic Church condemn the act of collecting hES cells and why is it analogous with abortion? Irenaeus one of the Church Fathers stated the following:

Indeed for us murder is forbidden once and for all, so it is not permitted even to destroy what is conceived in the womb. To prohibit the birth of a child is only a faster way to murder; it makes little difference whether one destroys a life already born or prevents it from coming to birth. It is a human being, who is to be a human being, for the whole fruit is already present in the seed.

Here Irenaeus explains that abortion equates to murder. However, the most important line in this quote is the famous Latin dictum: *Homo est et qui est futurus* translated into "It is a human being,

who is to be a human being.” This means that anything that will develop into a human being if left alone, IS a human being. In other words, a person is a human being from conception. The ideas of this second century theologian are still applicable today. Since the ICM would develop into a human person, extracting the ICM to produce hES cells is unethical, according to the Catholic Church, even if these stem cells could provide many benefits to patients and further current studies.

According to the Vatican there are about 1.2 billion Catholics in the world. When the Catholic community shows a strong opinion on something it can have worldwide effects. In this way it can ‘galvanize public opposition.’ Whether or not people are religious abortion will always be a controversial topic. The response of the scientific community is immediate and appropriate. Because of the controversy of abortion, the difficulty in means of acquiring of hES cells from donors, and possible legislature limitations scientists are forced to find different ways of acquiring a cell with the properties of human embryonic stem cells. This property is known as pluripotency. *Pluri* means many and *potent* refers to strong or able; this means that the hES cells are able to produce cells that are from all three germ layers: the endoderm, the mesoderm, and the ectoderm. This pluripotency is only seen in hES cells and not in adult stem cells derived from bone marrow and adipose tissue or perinatal stem cells taken from the umbilical cord blood and amniotic fluid. Embryonic stem cells are pluripotent in that they are capable of giving rise to all tissues of the developing organism across all three embryological germ layers when allowed to differentiate within the appropriate microenvironment. In contrast, adult stem cells are multipotent in that they give rise to specialized cell types restricted to an embryological germ layer, even despite cultivation within a nurturing embryonic environment.

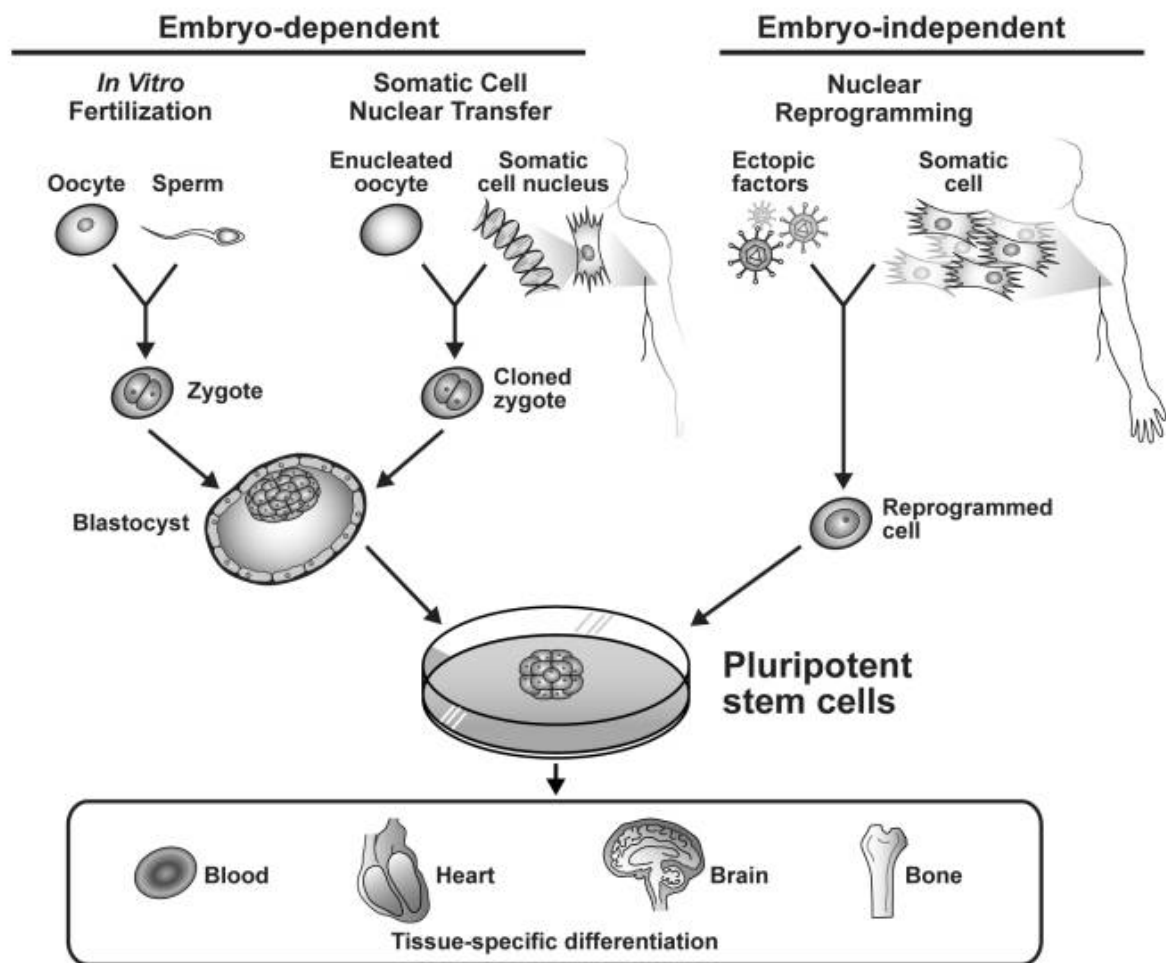
Biologists have found two ways of eliminating the need of two human donors for acquiring hES cells. The first is through Somatic Cell Nuclear Transfer (SCNT), a process made famous in cloning Dolly the sheep. The egg cell or oocyte and the sperm cell each have half of the amount of chromosomes that a fully developed human cell would have. SCNT involves enucleating an oocyte, taking out its nucleus, and injecting the complete³⁷ nucleus of a somatic cell or body cell. The enucleated oocyte now has the nucleus of a somatic cell and together they develop into a zygote with the same DNA as that of the donor of the body cell. It is done through the Inactivation of Cdx2 gene in murine fibroblasts using lentiviral RNA interference before nuclear transfer. However, this process is still embryo-dependent and still extracts the inner cell mass that would ideally form a human baby if left alone³⁸. Nevertheless, this is not the case because the embryos produced are incapable of implantation because of the Cdx2 gene. The result is disabled or defective embryos whose only purpose is to produce inner cell masses

³⁷ Complete is referring to having all 46 chromosomes. This is to differentiate from the gametes (the oocyte and the sperm cell) which have 23 chromosomes each. In the making of an embryo the two gametes fuse to make a complete cell. SCNT does not require donations of gametes, instead it uses a somatic cell that could be acquired through a simple biopsy. However, it still ultimately develops into an embryo from where the ICM is collected.

³⁸ *Homo est et qui est futurus*: “It is a human being, who is to be a human being.” In this case it is not sure what the Church’s stance would be because of the defective embryo incapable of implantation. In other words, it would not develop into a human being. Whether religious or not this is still an ethical concept of great debate.

(Zacharias). Although it is an alternative it may still be looked at as an unethical substitute in the eyes of many including the Catholic Church.

Instead biologists have found a way to make pluripotent cells that are acquired through an embryo-independent process. It is called induced pluripotency by nuclear reprogramming. The nuclear reprogramming of ordinary fibroblasts requires only the retroviral transduction of four transcription factors (*Oct4*, *Sox2*, *c-Myc*, and *Klf4*) into the cells. Through what is known as ectopic factor-mediated nuclear reprogramming one can acquire induced pluripotent stem cells (iPS cells).



In other words an individual could get a biopsy and have his own body cells be turned into personalized iPS cells. This is a process that does not involve the ‘killing of a potential baby’ instead it tricks the body cell into becoming a pluripotent cell. There is no use of an embryo nor any enucleated oocytes. The regenerative applications of iPS cells for treatment have been demonstrated in various models that include sickle cell anemia, Parkinson disease, hemophilia A, and ischemic heart disease. Compared to hES cells, iPS cells are just as versatile and are even more readily available. There is no fear of rejection because it is made from one’s own body so immunosuppressive drugs are not necessary. There is no problem with ethicality in iPS cells and it is easily reproduced.

Without the influence of the Church scientists would not have been in such a rush to find an ethically acceptable alternative to hES cells. By stopping scientific practices it allowed the scientific community to reflect and find another way of acquiring pluripotent cells. This new process may lead to future findings that may not have been discovered if biologists simply continued work on hES cells. The availability also allows for quick, easy, and repeatable research opportunities for more scientists.

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