

Interference with Nature: Xenotransplantation Procedure and its Potential Effects on Man

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Introduction

Xenotransplantation has the potential to not only harm animals; it would also affect the recipient as well as the non recipient and even the entire environment. The use of animals as xenografts would make most animals to go into extinction and thereby reducing the already over depleted biodiversity in the world. This is an injustice to animals that are arguably in possession of a right to existence in the ecosystem. To use them as means to satisfy the end of humans is unfair. It becomes more unjust if we understand that the end these animal xenografts, are meant to serve is outweighed by the problem that it would cause on the recipients and their relatives and to the entire world by extension. Xenografting is believed to be capable of introducing a novel disease into the world, a disease of the same kind as AIDS, which would be infectious and thus would endanger even the non-recipient of the xenografts. Xenografting is just like a time bomb waiting to explode. If it does lead to a world plague, who knows, perhaps, the whole world would be wiped out; for this disease could be more devastating than AIDS and other known killer diseases.

This research therefore, using the philosophical method of critical analysis and creativity carried out an intensive appraisal of the inherent dangers and ethical problems that surround xenografting and from there made some recommendations. It recommended that the billions of money put in the research for xenografting should be invested in the finding of the preventive measures of the ailments that xenotransplantation is out to cure. Researches should be geared at finding possible ways to remove these diseases from the human race entirely. Most of these ailments are traceable to environmental degradation, thus the billions of dollars used in the research on xenografting should be put in the maintenance of sustainable environment. When this is done the researcher believes that the problem that xenotransplantation was meant to solve would be alleviated in a way that is ethically laudable.

Meaning and Types of Xenotransplantation

Xenografting also called xenotransplantation is the transfer of organs, tissues and cells from species of a different kind to another. In this work we see it as the transfer of organs and tissues from animals to human. The use of animals as source of organs, tissues and cells for transplantation into humans has been practiced for some time now. This procedure (xenotransplantation or xenografting) started as far back as 1904-1906 with Mitt Carrel and Guthrie. They performed autogenous vein grafts, leg replantation in dogs, and the famous patch-grafts (Samdani <http://emedicine.medscape.com/article/432418-o...>).

xenotransplantation procedure is basically categorized into four; solid organ xenotransplantation, cell and tissue xenotransplantation and extracorporeal perfusion. Solid organ xenotransplantation is a procedure whereby an animal organ like kidney or liver is transplanted into human as a replacement of the original organ. Cell and tissue xenotransplantation is the transplantation of tissues and cells from source animals to human beings as replacement of the original tissues in humans. Extracorporeal perfusion is a procedure whereby the blood of the patient is made to circulate outside of the human body through animal organs, such as a liver or a kidney, or through a bio-artificial organ produced by culturing animal cells on an artificial matrix. Human/Animal Hybrid is a procedure where human cells are grown in a culture with non-human animal cells that are transplanted back into human patients.

Source Animals for Xenotransplantation

Chimpanzees were generally considered to be the best source animals for organ transplants compared to other primates because of their close affinity with humans, but due to their endangered status, attention were shifted to baboons. Baboons being the next most preferred source animals though existing in abundance, fared badly in captivity, have a long gestation period and are capable of few offspring. According to FDA (Food and Drug Administration) committee known as BRMAC (Biologic Response Modifiers Advisory Committee), nonhuman primate donors pose the greatest threat of transmitting latent, intracellular, or unidentified organisms, including retroviruses. The committee therefore, recommended that nonhuman primates should not be used as sources of xenotransplantation (US Food and Drug Administration. <http://www.fda.gov/cber/rules/frigene011801.htm>). This recommendation led the search for other suitable animal donors of organs. Most of the scientists are of the agreement that pigs have the potential to be the right candidate for organ donation. This is because pigs are in abundance, quick to mature, breed well in captivity have large litters, and have vital organs that are roughly the same in size to that of humans. Their use is also argued to be less resentful to the society because they are already an accepted source for societal meat. Pigs are also believed to be less likely to introduce new diseases to human because of their distance to humans in the evolutionary chain. Other reasons why pigs are preferred include:

1. Pigs because of their ability to fare well in captivity, can be raised in a highly controlled way, thus, their organs are less likely to transmit infectious diseases to humans.
2. Pigs could be genetically engineered to contain human genes. This would make the animal organs or cells to be readily accepted by the patient immune system.

In spite of these advantages, pigs xenografts is believed to be capable of experiencing severe immunologic barriers than the nonhuman primates because of their distance from man in the evolutionary chain.

Potential benefits of Xenotransplantation

Xenotransplantation is believed to be capable of serving as a complete substitute for human organs, thus easing the current shortage available for transplantation. It could also serve as a bridge or temporary organ until a permanent human organ could be found. Other benefits of xenotransplantation include:

1. Xenografting is helpful in the treatment of diseases. People with serious kidney, liver or heart disease, diabetes or Parkinson's disease which have defied all known treatment could be treated through xenotransplantation. People needing bone marrow transplants could also benefit from xenotransplantation. cellular xenotransplants for instance could treat people suffering from diabetes, Parkinson's disease or other diseases. The treatment involves replacing specific cells or tissues which do not work properly as a result of the disease, for diabetes these cells are the islet cells of the pancreas; for Parkinson's disease they would be brain cells. These cells are difficult to be obtained from human donors. People with liver failure could be treated with an extra-corporeal (outside the body) xenotransplant using a healthy pig liver. In this process, the patient's blood circulation is made to pass through a pig liver that is kept outside the patient's body. Sometimes this is meant to be temporary until a suitable human donor is sought for, but sometimes this is all that is needed to allow the person's own liver to recover and start working again.

2. Xenografts give the surgeon enough time to eliminate potential pathogens. In allografting (human to human transplantation) organ which are usually transplanted from a brain dead patient are given little or no time for examination to ascertain the health state of the organ, due to the urgency involved. The transplant organ therefore could come from a suboptimal donor with advanced age and chronic medical condition or from a carrier with undetected infectious agents or malignant cells. In contrast, in xenotransplantation, a donor pig is raised under controlled conditions and specifically intended for use as an organ donor. In this case, the donor pig can be extensively analyzed to eliminate all pathogens.
3. In xenotransplantation animal donors could be genetically modified to be resistant to many human pathogens specific to human tissues, such as HIV, hepatitis, and human cytomegalovirus.
4. Introduction of xenotransplantation would eliminate 'black market' in human donor organs. Due to the scarcity of human donor organs and the large number of patients on the waiting list for organ transplantation, it is believed that human organs could be procured illegally. Some patients whose lives would have naturally been saved would be allowed to die by the doctors in order that their organs would be used for transplantation. Xenotransplantation it could be argued would help stem this abuse.
5. Xenografting could save hundreds of thousands of lives. This is because, patients who otherwise would not have been eligible for transplantation because of shortage of human organ, would receive organs and tissues through xenotransplantation. Xenotransplantation therefore could eliminate poor quality of life situation for patients, such as kidney dialysis.

Potential Risks of Xenografting

In spite of the numerous advantages that could accrue to humans if xenografting becomes a clinical success, there are a lot of risks that are associated with xenotransplantation. these risks include:

1. The risks of introduction of zoonosis: zoonosis is the infection of human by agents like bacteria, viruses, fungi. The possibility of transmission of infectious agents raise questions regarding the safety of using xenotransplantation in individuals, but it could also potentially place the general public at risk. Like humans, animals may also be infected with microorganism which could be specie specific (that is, it is not transmittable to other species). For instance, the transmissible virus of pigs causes diarrhoea in pigs but does not cause any sickness in people. However, other kind of micro-organisms is not specie specific, which means some of them can infect animals and also cause disease in humans. An example of this is influenza. The flu first infected birds and pigs and though, it does not make these animal sick, when it passed to humans, it makes them sick. The word zoonosis therefore, refers to zoonotic diseases that may pass to human through xenotransplant (Vanderpool, 1999). Most mammals are known to have a kind of virus embedded in their DNA known as "endogenous retroviruses." These viruses are passed from one generation to the next without causing havoc in the host species. All pigs are believed to carry such viruses called PERVs (Pig or Porcine Endogenous Retroviruses). These are normally inactive and thus do not cause disease to the pigs. The concern among scientists is that PERV may become active and infect the human cells.
2. The xenograft may not work well especially if it is replacing an essential organ of human. Since the environment in which animal organs function are quite different from the one the human organ function in, it is feared that these organs may not

function well in humans. For instance, the temperature which pig organs function in is 39 degree Celsius which is different from the 37 degree Celsius of humans. Also the life span of a pig is roughly 15 years, which brings the fear as to whether or not pigs transplants in man would live more than 15 years.

3. The high level of immunosuppressive drugs needed to overcome immune rejection may be counterproductive. This may leave the patient susceptible to other infections. The immune system fights foreign agents that invade the body like bacteria, fungi and viruses. Thus, suppression of the immune system would leave room for easy invasion of the body by these micro-organisms.
4. Xenotransplantation could potentially lead to a world plague. There are fears that xenotransplantation is capable of introducing novel infection to humans, which would be transmitted from man to man and thereby leading to a new world plague similar to HIV.
5. Xenotransplantation could lead to a lot of ethical dilemmas as shall be discussed in the next sub-heading.

Interference with Nature: Ethical Implication of Xenotransplantation

One charge that has been raised against xenografting is that, it is unnatural and therefore wrong. This point is one of the main reasons why people generally tend to view xenotransplantation with some kind of dissident. It is this same line of reasoning that leads to a large scale disquiet regarding homosexuality and other areas of medical science like assisted conception and reproduction, cloning and most other forms of genetic engineering. As in other ethical issues, there are proponents as well as opponents of this view.

Jonathan Hughes (1998) is one great opponent of this charge of unnaturalness. According to him, it is highly difficult to define what is natural and what is not natural. On one side, it could be argued; he claims that all that humans do is unnatural, because it is a sort of interference with the order in nature. Clearing of bush for farming for instance, could be seen as unnatural because it involves an interference with the natural order of things; even fetching of water from rain could be unnatural because it involves an interruption of the natural course of the rainwater. Thus, going by this argument, it could be said Hughes argues that, we cannot actually avoid interrupting or interfering with nature. On the other hand, continued Hughes, it could also be validly argued that, nothing that humans do is unnatural, because human themselves are part of nature. This implies that as part of nature, all activities of humans are natural. It is not possible for natural beings to do things that are not natural. Thus, if everything man does is natural, then none of his actions could be termed wrong. Hughes concede to the fact that these two views may be accused of extremism which would lead to a call for a middle course which would make better sense. However, he claims that it is difficult to find a middle ground where a line could be drawn, to determine what is natural and what is not. And even if this line is drawn, it is possible that the things we now condemn as unnatural may fall on the side of natural and those things we now acclaim as natural may fall on the other side. Thus, until that line is drawn, we cannot point to anything and call it natural and to another and call it unnatural.

John Stuart Mill (1904) took a more radical approach than Hughes. He asserts that even if xenografting procedures are proven to be unnatural, it carries no moral significance, for there is nothing wrong with that. The interference with nature according to him is the only means by which humans could survive in the world. This he said is because, "nature's powers are often towards man in the position of enemies, from which he must wrest by force and ingenuity, what little he can for his own use. This implies that even if it is proven that xenografting actually interferes with nature; there is nothing wrong with interference with nature. This is because, it is only by interference with nature that man can survive in this

harsh environment. It is only from interference with nature that he can free himself from natural phenomena like infectious pathogens, earthquakes, hurricanes, flood, drought et cetera. Humans have to interfere with nature in order to overcome or mitigate these natural evils.

Augustein (1968) on the other side of the debate argues that man's interference with nature is wrong based on the biblical narrative in the book of Genesis 2:15, where man is placed as the steward of creation. According to him, this stewardship is exercised by monitoring the limits inherent in nature and society. Xenografting has therefore, traversed these limits and so is immoral. However, Robert Francoer as quoted by Uduigwomen (2003) also using the bible, argues in the opposition thus

But it seems to me also that in our panic we have deliberately avoided one of the most important premises of our Judeo Christian tradition. We have always said often without real belief that we were made and created by God in His Image and Likeness, 'let us make man in our image after our likeness' logically means that man is by nature a creator or at least a co-creator. In a very real awesome manner, not a mere collaborator; nor administrator nor caretaker. By divine command we are creators – why then, should we be shocked today to learn that we can now be able to create the man of the future? Why should we be horrified and denounce the scientists or physicists for claiming to play God's; is it because we have forgotten the Semitic (Biblical) conception of creation as God's ongoing collaboration with man. Creation is our ongoing role and our task is ongoing creation of the yet unfinished still evolving nature of man (429).

This means that human beings as creators or co-creators could interfere with nature, recreate, redirect, reshape and redesign it as they wish. Lynn White Jr (1967) using the same bible argues against Francoer and in support of Augustein. White blames the evolvement of practices like xenografting on the crisis of Judeo-Christian beliefs. According to him, the main strands of Judeo-Christian thinking had encouraged the overexploitation of nature by upholding the superiority of humans over all other forms of life on earth, and by depicting all of nature as created for the benefit of humans. White came to this position based on the teachings of the Church Fathers and the Bible itself which, according to him supports the anthropocentric perspective that humans are the only things that matter on Earth. Since they are the only thing that matter, they are free to utilize and consume everything else to their advantage. White saw, *Genesis* 1:27-8 as an example of the anthropocentric perspective in Judeo-Christian religion, it states:

God created man in his own image, in the image of God created he him; male and female created he them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over fish of the sea, and over fowl of the air, and over every living thing that moveth upon the earth.

According to White, the Judeo-Christian belief separates man from nature. For instance, the belief that humans are created in the image of a God who is radically separate from nature, by extension separates humans themselves from nature. This ideology White believed, encouraged the exploitation of nature and has influenced the way modern Western science sees nature. Modern western science, White argues, was "cast in the matrix of Christian theology" so that it too inherited the "orthodox Christian arrogance toward nature". This implies that, without technology and science which received its influence from Judeo-

Christian religion, the environmental extremes to which we are presently exposed to would probably not be realized.

Bill Clark in his work, *The Range of the Mountains is his Pasture: Environmental Ethics in Israel* argued in support of Augestein and White. He laments the misinterpretation of the scripture across the ages that have led to the plundering of Nature. One such off-quoted passage he maintains, is Genesis 1:26 which reads: “and God said: let us make man in our image, after our likeness; and let him have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over the earth, and over every creeping thing that creepeth upon the earth”. He argues that the Hebrew word translated into English as dominion does not mean merely the exercise of authority but a command to be responsible for the well-being of every animal on earth. This he holds could be gleaned from the many religious laws and ceremonies that assured the conservation of nature in ancient Israel. Examples of these laws are:

1. Exodus 23:1 and 5, where the Bible stipulates that when someone comes upon a strayed animal, one must return to its owner, even if the owner is an enemy; and that an animal in distress must be helped.
2. Proverbs 12:10, which reads, “a righteous man careth for the life of his beasts, but the mercies of the wicked are cruelty”.
3. Exodus 23:12, where God commands all Jewish farmers along with their beasts to observe the Sabbath.
4. Deuteronomy 25:4, where the Bible commands, “thou shalt not muzzle the ox when he thresheth out the corn”. This means that animals should not be teased with the sight of food.
5. The Jewish concept of Kosher law, which stipulates that every farmer should take the seventh year as a year of rest. Clark believes this is one of the first law aimed at sustainable development promulgated by humans. The Sabbath requires all farmers to leave all fields fallow every seventh year. This field would not be pruned, cultivated, weeded, or harvested. In addition, this field is required to be opened to wildlife.
6. 10 percent of every field to be left 'unharvested'. The kosher law according to Clark also requires that in productive years, a farmer should allow 10 percent of his/her field 'unharvested' that the beasts may eat (186).

Based on the bible therefore, he proposed three principles that should be observed while considering xenografting to include:

1. Humans and animals should coexist in the ecosystem, for they share a common evolutionary heritage. This is because “that which happens to men happens also to animals, as one dies, so dies the other; yes, they all share one breath; so man has no pre-eminence above an animal” (Ecclesiastes 3:19).
2. Humans as moral beings have an obligation to act as responsible stewards and not as tyrants towards other animals.
3. Life itself has an intrinsic value and not only an extrinsic value and thus no animal should be subjected to unnecessary or cruel treatment.

These principles are accepted by this researcher, with the belief that if they are allowed to guide the deliberations concerned with decisions on whether or not xenotransplantation should be carried out, positive decisions would be reached.

O.P.Dwivedi (1990) in his work entitled, *Satyagraha for Conservation: Awakening the Spirit of Hinduism* supports the idea that interference with nature is wrong. He unlike Clark and Augestein argues from Hinduism point of view. He portrays Hindus' as believing that God was himself incarnated in animals. He first incarnated himself in the fish, then the tortoise, a boar, a dwarf and then a man-lion. Hinduism he says also believes in a cycle of birth, where a person could come back as an animal and vice-versa. This doctrine according to him,

informs the doctrine of 'ahinsa', which abhors violence against humans and animals. According to him, the Hindus believe God's grace can be obtained by not killing or harming his creations. Abstinence from meat is seen as a duty; and the killers of animals are believed to be doomed to suffering in hell fire in number of days corresponding to the numbers of hairs on the body of the animals they killed. Thus according to Dwivedi, interference with nature through xenotransplantation is wrong and should be halted. This is because to interfere with nature is to interfere with God. That is, for Hindus, both God and nature are one. While the 'Prajapah' (God) is conceived as the creator, he is also the protector of creation and its eventual destroyer. Creation to Dwivedi therefore, is manifestation of God and to interrupt or interfere with it is to interrupt and interfere with the manifestation of God which could lead to the incurring of his wrath. This reasoning of Dwivedi may not be supported by many but is plausible when we consider the many problems that have plague the world of today; can one not argue that these are signs of the anger of God? The earthquakes are becoming more frequent; almost on a daily basis we hear of flood, hurricanes, tsunamis, drought and other natural disasters. The HIV epidemic has defied all medical cures. These could be signs that prove that Dwivedi is right as many theologians belief. This researcher sees these happenings in the world as the boomerang effect of our rude interference with nature. Any action that disturbs the balance of the nonhuman Nature has a way of pushing itself back to the humans themselves. The reverse also is true, positive actions towards the environment yield positive dividends to humans. Authentic wisdom therefore, has to consist in striving to maintain a balance in the ecosystem, so that humans themselves would also experience this balance. Xenografting procedures as a negative force that attempts to destroy the balance inherent in the world, if allowed to continue would definitely boomerang on us, perhaps by way of introduction of a new infectious disease to humankind. The boomerang effect would be equal to the extent of destruction done on animals, for action is always equal to reaction.

Mawil Izzi Deen (1990) in his work *Islamic Environmental Ethics, Law, and Society* holds a thesis that is similar to that of Dwivedi but unlike Dwivedi argued from the Islamic point of view. He argues that humans are not owners but the maintainers of balance and measure for everything God created. For "Allah knoweth that which every female beareth and that which the wombs absorb and that which they grow; and everything with him is measured" (Surah 13:8). According to him therefore, humans are meant to maintain a balance in creation because doing so proves the creator's existence. His argument is that, since creation proves the existence of a creator, destruction of creation is itself a destruction of what testifies to the greatness of God. Xenografting destroys creation. It is therefore according to Deen, a destroyer of what testifies to God greatness. Man is kept on earth according to him, to maintain the earth and not to destroy it by creating creatures of his own liking – creatures which could be said to be both human and animals. Islam being a religion of utter submission to God, who is the master of all worlds, according to Deen is a religion that also submits itself to the sign of the existence of the creator and his unity. Thus, according to Izzi Deen, that the world (environment) exists and is made by the creator is a sign that means that each part of the perfect system of creation is united and interdependent. Creation therefore, he argues, should exist in harmony as different parts of the whole. Each part of creation serves to testify to the wisdom and perfection of the creator. The attempt of xenografting to destroy animals for the benefit of humans is an attempt to destroy the perfect ecosystem that has been arranged by God. The foundations of nature protection that are carved from Islamic teaching are given by Izzi Deen as follows:

1. Nature is God creation and to protect it, is to preserve its values as a sign of the creator. Thus the environment is not created for the sole purpose of human use, it also testifies of the greatness of God. Thus xenografting destroys this sign of God.

2. The component parts of nature are entities in continuous praise of their creator. This is portrayed in this verse of the Koran “the seven heavens and the earth and all that is therein praise Him, and there is not such a thing but hymneth his praise; but ye understand not their praise (Surah 17:44).
3. All the laws of nature are laws made by the creator and based on the concept of the absolute continuity of existence. This means that all that happen is by the will of God, and humans must accept it. Thus, the quest to engineer a better man by biomedical scientists is a refusal to accept the will of God as manifested in his creation. This is referred by many as ‘playing God’.
4. Humans are not the only community to live in the world. For “there is not an animal in the earth, nor a flying creature flying on two wings, but they are peoples like unto you” (Surah 6:38). This means that, though humans currently have the upper-hand over other creatures, these creatures are worthy of respect and protection, since they are also beings. They also have the right to existence which must be protected by man.
5. All human relationships are built on justice and equity. This tradition, he believes limits benefits derived at the cost of animal sufferings. According to him, Prophet Mohammed asserts: “verily Allah has prescribed equity in all things. Thus, if you kill, kill well, and if you slaughter, slaughter well. Let each of you sharpen his blade and let him spare suffering to the animal he slaughters” (Deen, 1990).
6. The balance of the universe created by God must be preserved. This he believes is because the Quran avers, “everything with him is measured” (Surah 13:8).
7. The environment is not in the service of this generation alone. The environment he argues is the gift of God to all ages, past, present and future. Xenografting procedures may bring negative consequences on the future.
8. No other creature is able to perform the task of protecting the environment. This he believes is because God entrusted humans with the duty of care-taker, a duty no other creature can accept. The Quran avers, “Lo! We offered the trust unto the heavens and the earth and the hills, but they shrank from bearing it and were afraid of it. And man assumed it (Surah 33:72). This duty of caretaker is a duty to protect the animals and not to destroy it.

Deen captures the whole creation as having intrinsic worth in themselves. We totally agree with him, no creature is created for the other. We are all created for each other. Animals are not created for humans, neither are plants created for animals, but all creatures exist in a complementary relationship of mutual service to one another. No being has only instrumental value and no creature has only intrinsic value, all creatures have the two captured in a harmonious relationship. To employ animals as objects of transplantation to the service of humans is to deny the complementary relationship that exists in the world. To use animals as means to the end of man, is to deny them the intrinsic value that, they necessarily possess by virtue of their being part of the ecosystem. Animals have worth or value in themselves. The snail for instance, deserve the right to be respected and cared for, irrespective of whether or not it is useful to humans or not. Whatever exists, whether living or not, inasmuch as, it exists, has intrinsic value and not merely instrumental value. Everything shares the same complementary horizon. this has been Asouzu resounding dictum. He claims: “anything that exists serves a missing link within the framework of the totality” (Asouzu 1990). This means that, no being exist in isolation, but in a complementary relationship with others. To be, is not to be alone but to be in a mutual complementary relationship of joyous service (Asouzu2004)). This is supported by Naess (1989), who holds that all organisms are best understood as “knots” in the biospherical net. The identity of a living thing is essentially constituted by its relations to other things in the world, especially its ecological relations to

other living things. If people conceptualise themselves and the world in these relational terms, Naess argues, then people will take better care of nature and the world in general. Naess conceives human ego to be identified with nature. Thus by identifying the ego with nature, Naess believes that we can enlarge the boundaries of the self beyond my skin to beings outside. He calls this, ecological Self (the capital "S" emphasizes that we are something larger than our individual body). Thus to respect and to care for the Self is also to respect and care for the natural environment. "Self-realization", according to Naess is therefore, the reconnection of the human individual with the wider natural environment. Naess maintains that the deep satisfaction that we receive from identification with nature and close partnership with other forms of life in nature contributes significantly to our life quality. He advocated that rights should be extended to other beings because there also have interests. Asouzu supports this; he asserts that a being could be considered to exist and is in control, if he/she affirms the right of others to be and understands that he/she affirms his/her existence by affirming the existence of others and by understanding the right of other missing links (Asouzu 2007). Animals too are missing links whose rights need be respected. Asouzu (2007) defines missing link thus: there are

Units and units of units, things and things of things, essences and essences of essences, accidents and accidents of accidents, forms and forms of forms, ideas and ideas of ideas, thoughts and thoughts of thoughts etc, as these relate to each other in time and space and with regard to other modes of this complementary relationship in quantities and qualities, in kind and in differences as these seek to build an intrinsic harmonious whole in mutual service.

Thus, all modes of expression, existence and experiences of being in history according to Asouzu are missing links which, maintain their being so far as there can be conceived in complementary relationship. Animals as missing links of reality need be respected and not treated as mere instrument to further man's end. Tampering with them is interference with the beauty of nature and thus a destruction of the fundamental complementary horizon that hold all beings together.

Conclusion

Xenotransplantation puts a knife to the complementary relationship that exists among realities in the world. The potential benefits of xenotransplantation notwithstanding, this research condemn xenotransplantation in its entirety, due to the risks it could possibly bring to the world. In addition to the possibility that it could open up the recipient to many infectious agents, it could also introduce a novel and contagious infectious into humans, leading to a world plague – a plague that could equal or be worse than HIV. Even if xenotransplantation would pose no health risks to humans, it would not be justified, on the basis that it hurt animals, which are an important part of the ecosystem. Killing of animals for their organs and tissues for transplantation tempers with the fundamental right of animals to existence. It also alters the natural order of things by trying to play God. By transplanting organs of animals into humans, xenografting creates a new creature, which is arguably neither human nor animal but both. By transplanting into humans, organs from animals, xenotransplantation obliterates the line that separates animals from humans. This would mean that the differences between animals and humans is a matter of accident and not substantial. If this is the case it would mean that animals are capable of sharing the same eternity with humans. Due to the ethical dilemma xenotransplantation is capable of creating therefore, it is the belief of these researchers, that all attempts at bringing xenotransplantation to birth would need to be stopped.

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