Transfiguring the Human: Autonomy and Identity as Bodies Become Sites of Technological Interventions

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Abstract: Globalisation has changed the face and practice of medicine intertwining national and economic interests with patient care. Medicine has evolved into a true science installing new technologies and active therapies developed in state-of-the-art laboratories sponsored by universities, governmental agencies and private companies. The discovery of the major histocompatibility complex, genome editing and CRISPR/CAS9 technologies significantly altered the field of organ transplantation and also the treatment of cancer, heart diseases and HIV infections. Robin Cook draws the readers' attention to the ethical quandaries of such bold experimentations with the natural order in his works *Chromosome 6* and *Pandemic.* Such transmutations and permutations to the genetic framework of organisms would undoubtedly upset the balance and stability of the planetary ecosystem. The concept of human autonomy and identity is seriously jeopardised with bodies being transformed beyond the natural order. Cook points to the general dehumanisation that has crept into the healthcare industry as a result of scientific and technological advances that threaten to tamper with the fundamental dimensions of humanity and upsetting age-old notions of human autonomy and identity. This article attempts a revaluation of the ethical and moral ramifications of transforming human bodies using cutting-edge technologies and its possible impact on human destiny both as an individual and as a species.

Keywords: autonomy, identity, xenotransplantation, transgenic, transmutation, ethics and morality, Robin Cook

Popular literature speculates on the impacts of new medical and technological advances on human bodies. Science fictional figurations of the future offer new visions about the possibilities of transforming and augmenting human bodies in order to eliminate aging and disease and thereby prolonging longevity. Speculative fiction, with its

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abundance of mythical images of doctors with god-like abilities to create and transform human life, commented on and influenced the medical establishments of the past and the present. Popular images of hospitals and popular images of the future seem inextricably intertwined with the evolution of medicine into "a collective, bureaucratic, and scientifically sophisticated system, so that now, for most individuals, the nearest equivalent to travelling through time into the distant future is becoming a patient at a modern hospital" (Westfahl 2002, 1). Globalisation has changed the face and practice of medicine intertwining national and economic interests with patient care. Medicine has evolved into a true science installing new technologies and active therapies developed in state-of-the-art laboratories sponsored by universities, governmental agencies and private companies. Patient care and medicine has slowly, but steadily, developed into the health care industry and become a part of the capitalist economy involving big money and little scruples. The human body became the coveted possession of medicine and daring experimentations aimed at prolonging longevity and improving the quality of life invariably raised apposite enquiries regarding the sanctity of the human body and human life, in general. Cross species transplantation or xenotransplantation is hailed as a revolutionising technique that guarantees longer life span and improved health to the human beneficiaries. These bold interventions and experimentations with the natural order have unprecedented ethical and moral repercussions. Scientific knowledge has instilled immense pride and confidence in man and has fuelled his instincts for transgressing the confines of the known world. However, the well-being of the human species and the survival of the planetary ecosystem depend unequivocally on the wise and judicious use of the immense power at his disposal.

Teresa Mangum (2002) claims that medical breakthroughs promise or threaten to forestall or even to reverse the decline from midlife through old age to senility and decrepitude. The age of new medicine ushered in by an avalanche of discoveries in molecular biology, genomics and information technology in the 21st century has revolutionised health care offering new insights into the possibilities of enhancing human capabilities. The discovery of the major histocompatibility complex, genome editing and CRISPR-Cas9 technologies significantly altered the field of organ transplantation and also the treatment of cancer, heart diseases and HIV infections. Kirk

Hampton and Carol MacKay (2002) believe that doctors, the technological healers of the body are intriguing, powerful and complex figures who apply both technological knowledge and a degree of craftsman-like intuition to their work. Giant strides in the field of artificial intelligence and cellular biology have paved the way for serious interventions into the human body with prosthetic limbs, neural implants, mind controlled exoskeletons and genetic manipulation redefining our very concepts of rejuvenation and immortality. Medical fiction offer probing insights into the contemporary medical establishment and critique the transformation of medicine into big business.

Dr Robin Cook's medical thrillers investigate the profane nexus between medicine and corporate business and dwell on the inherent dangers in the practice of medicine for profit. Sybil Steinberg (1990, 55) aptly notes that Cook's fiction is designed to "keep the public aware of both the technological possibilities of modern medicine and the ensuing ethical problems". Cook speculates about the impact of scientific technology on patient care and medical research. A vehement critic of the depersonalisation built into the health care industry, Cook exposes the esoteric realm of medical science and initiates serious deliberations on the ramifications of medical advances on the future of humanity. Medical research has attained a new dimension since the latter half of the 20th century with the amalgamation of superior technology and advanced knowledge of genomics and artificial intelligence. The use of cutting-edge technology and the ensuing ethical and medical implications on human life has been one of the major concerns of Cook's fiction. Cook's "cautionary and suspenseful tales of conspiracy and intrigue set within the worlds of medicine or medical research" (Stookey 1996, 1) elucidates various ethical and medical issues on one hand, and on the other, explore the realm of futuristic possibilities in the practice of medicine. He strongly believes that medical practice and research must be grounded in morality and ethics. It is a purely humane enterprise and hence no man has the right to play God and sport with life.

Cook confronts the medical ethics of genetic xenograft manipulation using 'recombinant DNA technology and transgenic' in his 1997 fiction *Chromosome 6*. Molecular biologist Kevin Marshall took pride as a man of science and reveled in his power to create life. He creates a race of transgenic bonobos using recombinant DNA technology that evolve into a race of proto-humans compatible with

their human doubles. These transgenic bonobos could be sacrificed on demand for xenografts. Man's ultimate desire to rejuvenate his decaying body and live forever has ignited several such audacious attempts. The protagonist, Dr Kevin Marshall rejoiced in the sheer pleasure of discovery and credited himself for revolutionising biomedical research in a way that would better the lives of millions of humans. He had made it possible to create an immunological double for an individual. It would be a new lease of life for the terminally ill patients in dire need of organ transplantation. The reproductive technologist, Melanie Beckett, who shares his enthusiasm for the project understates the ethical concerns: "I'm so thrilled with the involved science and what it can do for a patient that I try not to think about it" (Cook 1997, 72) The exorbitant costs of xenograft surgery made it unaffordable to the poor and only a few highly select individuals received the benefits of the medical procedure. Kevin foresaw a future where everyone, rich and poor, would equally reap the golden fruits of his painstaking labour.

Robin Cook sounds a potent warning to the misuse of scientific knowledge in the health care industry. With the increasing invasion of high profit business into medicine the pressure on researchers and medical practitioners is significantly higher. Greed for fame and money forces man to tread along strange and dangerous paths and perform unthinkable deeds. *Chromosome 6* is an emphatic reminder of the perils of genetic engineering. It is a pointer on what modern science and medicine could achieve in the near future. The live human body will become the favourite play thing of a group of elite scientists and doctors. Rejuvenation of diseased and aged organs that guarantees an extended and healthy life would be a new lease of life for the rich patients. It would be an audacious step towards attaining man's cherished dream of immortality. The GenSys Corporation was funding the project that claimed to custom-design "the perfect organ transplant source for a specific individual" (Cook 1997, 430). The very idea of manipulating the human genome and creating a new species of transgenic bonobos that could be sacrificed on demand during the organ transplantation process challenges our notions of ethics and morality. Kevin confesses: "once I stumbled onto the ability to interchange chromosomal parts, the intellectual stimulation was so strong that I never considered other consequences" (Ibid, 363). The situation was principally unnerving for Kevin as he had unwittingly made creatures that resembled early cavemen. They had evolved into a

species exhibiting distinctly human traits. The human part of their heritage made these creatures unpredictable and Kevin begins to fear the terror that was evolving on the island. The feeling that he had committed a serious mistake resurfaced when he witnessed Bonobo No. 1 wearing his watch which was a stark reminder of the beast's odd position between man and ape: "My double is wearing my watch. This is a nightmare" (Ibid, 331). The transgenic bonobos were human enough to hunt and kill for sport. They had discovered fire and had evolved into a race of protohumans. They chained their human visitors using ropes and fought amongst themselves, killing each other with stone wedges, jeopardizing the entire GenSys project. The bonobos are imprisoned in concrete cells in the Animal Center, and Kevin feels that he had betrayed his own creations. The fate of his chimerical bonobos, abandoned to a lifetime of captivity in a tiny cage, compounded his guilt. He feels a profound sadness for these unfortunate creatures who had not asked to be created or born. "Their lives had suddenly and arbitrarily been doomed to monotonous incarceration" (Ibid, 410).

In *Chromosome 6* Cook tackles the ethical question of sacrificing one species for the well-being of another. Medical breakthroughs have transformed doctors and genetic engineers into the architects of a new world order devoid of conscience and dictated by pecuniary concerns. Organ transplantation surgeries are very common in modern times. Yet ensuring the availability of willing donors and compatible organs for transplantation is a major stumbling block. Bionic organs have gained popularity as an alternate surgical solution. Genetic engineering has made possible the creation of a future of genetically modified humans taking the place of transgenic animals who can be sacrificed for the requirements of their doubles. It envisages a frightening scenario where the existence of one human will be forfeited to alleviate the sufferings of another. The allure of a prolonged life span will initiate a heartless campaign for techniques that guarantee the realisation of this long cherished dream. *Chromosome 6* primarily trades on the recurring theme of immortality. The desire and drive for an immortal existence is so intense that morality and ethics become distorted. Kevin comes to terms with his guilt by setting the bonobos free into the wild. However Cook implies that man's dreams of a perfect and eternal existence would materialise only at an enormous cost and would inevitably usher in a future that is bleak, terrifying and empty of values.

Another novel by Robin Cook, *Pandemic* (2018) explores the application of the biologically potent chimerical CRISPR/CAS9

molecule "engineered from a bacterial immune system that had evolved to counter viral invaders" (Cook 2018, 1). With this new technology any known genetic sequence can be erased, switched, activated or terminated revolutionising medicine, agriculture and animal husbandry: "CRISPR/CAS9 has emerged as an enormously powerful, democratized gene-editing mechanism capable of rewriting the fabric of life, including human life" (Ibid, 2). Cook points out that the ease and accessibility of this potent and versatile tool of gene-editing has put so much power in the hands of professionals and amateurs alike that individual and corporate pursuits would be governed more by the possibility of maximising profits and indulging in passionate creativity and less by ethical concerns and the consequences to life in general, and humanity in particular. Cook fears that this "power of the creator in the hands of so many unregulated players beget as much peril as promise." (Ibid.)

The GeneRx company, owned by the Chinese businessman Wei Zhao, used CRISPR/CAS9 technology to alter and modify the genomes of pigs to create cloned and sterile, chimerical or transgenic pigs, whose organs could be harvested for transplantation. GeneRx specialises in the creation of genetically engineered customized human hearts grown in pigs that are immunologically matched to the recipients. Biochemical and pharmaceutical companies are engaged in substantial research hoping to reap large scale benefits from this new game changing CRISPR/CAS9 technology. "We are in the perfect position to benefit mightily from the limitless promise of CRISPR/CAS9 in so many arenas, from biopharma to designer babies for the wealthy in our IVF clinics" (Cook 2018, 335), claims Wei who is confident that this cutting edge gene editing tool would revolutionise the practice of medicine and also our notions of the limits and possibilities of the human body. Of all the cutting edge advances in the field of clinical medicine that capitalise on CRISPR/CAS9 technology, the most immediate, profitable and viable option was organ transplantation given the particularly high number of patients who die every day awaiting an organ transplantation. This new technology made it possible to engineer perfect matching organs for terminally ill patients with rare blood groups granting them a new lease of life. GeneRx is all set to take advantage of the incredible financial prospects opened up by the CRISPR/CAS9 technology: "It's a horse race, and the spoils are going to go to the first company out of the gate.

Knowing this, I committed our company to being the winner" (Ibid, 341).

Pandemic presents an appalling scenario where biotechnology firms and pharmaceutical companies in collaboration with super specialty hospitals conduct human trials without the knowledge and approval of governmental regulatory organisations or even an institutional review board. Wei professes his absolute disregard for the executive bodies in no uncertain terms and echoes a common intolerance towards the protocols regarding clinical trials on patients emphasised upon by the administrative and regulatory authorities: "I for one have little respect for such regulatory bodies. Biological science is moving much too quickly for bureaucrats to comprehend, much less regulate" (Ibid, 344). According to him human hearts grown in pigs was the future of transplant medicine which would save countless human lives. Patient safety and autonomy are blatantly sacrificed in the face of unethical and unauthorised experimentation that promises longevity and better health. The ethical question of sacrificing one species for the well-being and extended life of another that Cook had raised in *Chromosome 6* is echoed in greater clarity in *Pandemic*. Technology had bestowed immense power and knowledge at the disposal of a group of scientists, researchers and doctors that they make audacious attempts to sport with life. The shortage of donor organs and the advances in transplant medicine and biomedical research has ignited an interest in cross-species transplantation that would guarantee the availability of compatible organs. *Pandemic* represents a frightening scenario where the entire transplantation procedure is sabotaged by a group of Chinese nationalists when they introduce porcine retrovirus into the transgenic embryo triggering a pandemic. The transmission of retroviruses into the human cells represents a potential threat to human life. Even as xenotransplantation offers possible cure for terminal diseases and save hundreds of lives, the presence of animal organs in human body has psychological and ethical repercussions.

The concept of human autonomy and identity is seriously jeopardised with bodies being transformed beyond the natural order. Humans with animal organs or human organs grown in animal bodies could develop a sense of mixed identity. A growing consciousness of the presence of animal parts would make one question the autonomy of his existence and identity as a human being. The image of the self gets distorted raising pertinent questions regarding his identity as a full member of the species. An instinctual urge to escape death makes

xenotransplantation a viable and readily available option for many patients. The ethical, social and psychological effects of cross-species transplantation escape the immediate consideration of patients keen on getting a life-saving transplant and an informed consent regarding the possible aftermath of the procedure becomes a remote possibility. Thus the chances of an autonomous decision making considering the long term impacts of cross species transplantation on the individual, is heavily compromised. The enormous expenditure involved in raising the animals in a sterile, controlled, pathogen free environment and the exorbitant cost of the transplant procedure makes the procedure affordable only to the rich and the affluent. The level of social acceptance these patients with animal organs receive post-transplantation is a widely debatable issue as well.

The ethical quandaries raised by transplant medicine are profound and multifarious. The very idea of sacrificing one species for the welfare of another might appear selfish and functional to the advocates of animal rights. The potential benefits to a human being cannot justify the misery and subsequent death of an animal. Large scale use of specific species like bonobos and pigs would result in a substantial loss of valuable animal life. It is believed that manipulations to the natural genetic sequence would have long-term adverse effects on animal genomes. However the bio-medical community is poised on reaping the benefits of the CRISPR/CAS9 and is determinedly encouraging xenotransplantation as a sure means to overcome the shortage of human donor organs.

The astounding breakthroughs in biomedical research have pushed the boundaries of the human body. The boundaries of the organic human frame have been further pushed with the introduction of animal organs and bionic parts. The problem of compatibility and the phenomena of rejection of donor organs by the recipient body have been considerably resolved with the application of gene editing and genome modification techniques. This ethical conundrum that is a result of blurring the boundary between the human and the non-human is highlighted by Robin Cook in both of his works. This bodily intervention has raised pertinent questions regarding the dignity and integrity of the human existence, and has impelled debates on the nature of identity and selfhood. George Annas (2004) alludes to the "monster mythology" when he refers to the accompanying ethical dilemmas of genome manipulation and the creation of customised genetic sequences that would alter the genetic makeup of individual

organisms. Literature has always treated this theme with a note of skepticism, often regarding the genetically modified individual as an aberration upon the natural, normal order of existence. It is categorised as the 'other', as an abomination, and looked upon with fear and suspicion. The human-animal hybrids challenge the very notion of being human and raise serious questions about what it means to be human in the techno-scientific age.

Human enhancement using animal parts transgresses the boundaries of the human and creates a new race of humans which are a strange symbiosis of the human and the non-human. Technology has bestowed man with so much power and enterprise that man has become immune to the ethical quandaries unleashed by his audacious and remorseless attempts to tamper with the accepted and natural order of things. Xenotransplantation explores the limits of what is deemed as the human and the natural order of life. Bioengineered animals with compatible genome structure are created and reared in contained environments with little or negligible concern for their welfare. The precision of CRISPR/CAS9 technology, however, guarantees more specific and positive outcomes, with an increased rate of organ acceptance by the host bodies. The success and promise of such life-saving technologies brushes aside all the underlying ethical concerns. The scientific community is urged on by a utilitarian logic that constantly encourages them to push the boundaries of the human and transgress into the realm of the unknown and the non-human. It is precisely this scientific instinct that surfaces in Dr Kevin Marshall and Wei Zhao. Popular literature is abundant in its depiction of such bold men of science who dared to sport with life, like Victor Frankenstein and Dr. Moreau. Their inquisitiveness and scientific ardor justifies and sanctions even the most bizarre endeavors.

The 2001 Public Health Service "Guideline on Infectious Disease Issues in Xenotransplantation" that laid out the parameters for transplants from animal sources to humans categorizes the human recipients as 'xenotransplant product recipient', as carriers of a potentially infectious unique biomedical product, warranting lifelong surveillance and restricted mobility. "The price of rescue from deadly organ failure, in other words, was to become in many respects a social outcast, a permanent object of scientific and medical oversight", states Sheila Jasanoff (2018). Xenotransplantation turns out to be a life-saving and life-enhancing technique that holds promise of a possible cure from degenerative diseases. But the gene editing technique has

certainly triggered man's curiosity about the extent to which he could push his creativity and inquisitiveness. Life-saving treatment procedures that culminate in postponing death indefinitely pose a formidable ethical challenge. The desirability of genetic changes and its implications to the future of the individual, the society and the species at large is a debatable and controversial topic. Jasanoff wonders whether transplant medicine is risking man's capacity to respect the moral status of both partners by making human and nonhuman bodies more compatible with one another.

The collective human consciousness has always been fascinated by tales of scientists and doctors who have attempted to alter the characteristics of humankind. Xenotransplantation technology does not merely change our bodies and attributes. By doing so, it also changes the way we think of ourselves as a species. Such technologies entail an understanding of the human species at the molecular level. Human genes play a determining role in mortality and the limitations of the physical frame. The potential to alter the genetic makeup bestows man with the power to alter his destiny, both individual and social. The transmutation of human bodies as a result of cross species transplantation alters our perception of the human self and also the ways in which we as humans relate to each other and also to the other non-human species around us. Literature, however, has expressed a sense of mistrust and apprehension about the ethical consequences of such bold experimentations and its long-term impact on the future of mankind as a species. The very idea of combining the genes of different species and creating a new and unique being, where man does the role of the creator exercising god-like powers, inadvertently raises fundamental questions regarding life on our planet, finally.

Man regards himself as the epitome of creation and the notion of fooling around with the human genome by introducing the genes of animals/non-humans into his genetic framework with the help of recombinant DNA and CRISPR/CAS9 technologies, upsets and destabilizes the foundations of human existence. Added to this ethical quandary is the precariousness of releasing genetically engineered organisms into a stable environment. The atavistic urge to unlock the mysteries of the universe and exercise absolute control over nature also occasions a greater responsibility towards the life on our planet. Robin Cook attracts our attention to the general dehumanization that has crept into the healthcare industry as a result of scientific and technological advances that threaten to tamper with the fundamental dimensions of

humanity. The philosophical arguments concerning attributes such as sentience and value of organisms to the ecosystem determining the moral status of species on this planet underlie most of our informed responses to the moral trepidations of using one specific species for the welfare of another. The use of transgenic animal organs for transplantation introduces a potentially dangerous situation where human beings are exposed to the risk of infection with novel and incurable animal viruses, as Cook masterfully portrays in *Pandemic.* These transgenic creatures could be subjected to intense pain and suffering with the insertion of foreign genes into their system which interrupts their normal development leading to unpredictable behavioral and anatomical outcomes as we see in the case of the transgenic bonobos in *Chromosome 6.* With the ability to alter genetic anomalies and enhance bodily capabilities, human society itself would be divided into the wealthy genetically enhanced and engineered humans and the genetically imperfect and natural humans, creating two mutually exclusive and independent species. Cook, through his well-crafted narratives, drives home the vulnerability of our earthly species and the genetic codes of our natural ecosystem to the unintelligent use of genetic technologies.

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