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Future Figurations of the Human: Imagining Posthuman Subjectivity in Medical Science Fiction

Dr Lekshmi R. Nair
Dr Moncy Mathew

Technological posthumanism explores the astounding possibilities of life extension aided by cutting-edge biotechnological evolution in future medicine. Eternal life, bodily rejuvenation and physical augmentation have been the favoured tropes of medical science fiction. Advances in medicine appeal to the consciousness of humanity at large. The dehumanization that has invaded the health care industry in the wake of the technological revolution has altered the nature of patient-doctor relationship and has affected the quality of medical care offered. The ethical implications of audacious experimentations with the natural order have been the topic of heated debate in contemporary posthuman discourses. Posthumanist tendencies challenge the anthropocentric worldview, making critical enquiries into the possibilities of new forms of embodiments and hybrid subjectivities. As humanity is set to evolve into a race of 'posthumans' – a race of technologically mutated and augmented hybrid entities – capitalizing on the innovations in medical research and health care, there arises an increasing need to rethink our conception regarding autonomy of the human body and what it means to be human in the techno-scientific age. This paper investigates the posthuman world view presented in the medical science fiction stories of Brad Aiken and argues that

even as technology redefines notions of human identity, subjectivity and longevity, the need to preserve the sanctity of human life and the natural order cannot be undermined.

Keywords: Transhumanism, posthuman, augmentation, enhancement, dehumanization.

The rapid advances in therapeutic and restorative medicine, aided largely by the progress of science and invasive technologies have profound implications for human augmentation. The recent developments in nanotechnology, genetic engineering, molecular biology and information technology has ushered in an enhancement revolution. Science and technology have equipped mankind with innumerable options to control, manipulate and transform their physical environment to suit the needs of an evolving race. However, science fiction writers and transhumanists envision a future where humans would effectively control their bodies and minds with the help of converging technologies. Transhumanists believe that people would, in future, merge with their machines and transform themselves into a race of 'posthumans' enhanced with neural implants and digital augmenting technologies. Gene editing technologies like CRISPR (clustered regularly interspaced short palindromic repeats) enable scientists to successfully edit the human genome, in both adults and embryos. Recombinant DNA and CRISPR technologies can not only help cure diseases and heal an impaired body, but can also drastically revamp the human condition. Humanity would be able to control and shape its destiny as a species and evolve into a smarter, stronger and healthier race with the help of technological interventions. The human enhancement revolution would subvert and reorient all the predominant discourses based humanistic rational western thought.

Enhancement continues to entice the popular imagination and science fiction writers have brilliantly explored the possibilities of augmenting the physical form with the intervention of converging technologies. Miami based physician and science fiction writer, Brad Aiken's collection of Medical Science Fiction stories, *Small Doses of the Future* (2010) is an imaginative rendering of a futuristic universe empowered by cutting-edge developments in medicine and healthcare. The astounding pace of technological progress is felt keenly in medicine.

From enhancing the quality of life to life extension and anti-aging, the prospects of technological interventions have piqued the interest of a generation of biotechnologists, scientists and doctors, inspiring them to constantly challenge the confines of the known and the limitations of the physical frame. Body imaging technologies, advances in robotic surgery, medications utilizing the prospects of nanotechnology and gene-editing have revolutionized the practice of modern medicine. The future of medicine is predicted by writers of science fiction irrespective of the age they belong to. Specialising in Rehabilitation Medicine, Aiken also fantasizes on the multifarious ways in which new technologies can be used to treat people with disabilities and help them regain their independence. Brain-computer interfacing, neural implants, robotic exoskeletal braces and bionic prosthetic limbs are innovative interfaces between the organic and the inorganic that have leaped out of the pages of science fiction and invaded the real world of regenerative and therapeutic medicine and patient care. Aiken conjures a future where the application of converging technologies would invariably define and determine therapeutic medicine. His stories also raise awareness about the political and ethical implications of the impact of technology on the human species, individually and collectively.

Aiken weaves the web of his stories around the concepts of cloning, brain-computer interface (BCI), bionics, exoskeletal devices, telerobotic surgery, nanomedicine, biological warfare and artificial intelligence. The nine short stories in the collection are placed in a futuristic world where humanity unapologetically reaps the benefits of cutting-edge technological innovations. The prospects of wearable technologies like robotic exoskeletal devices, nanofiber suits and the possibilities of brain-computer interface in treating disability are explored in stories like "Locked In" and "A Time to Every Purpose". Emerging technologies would invariably allow the disabled to transcend their bodily limitations and regain control over their lives. Bionic limbs can be effectively controlled by connecting them directly to the brain using a refined brain computer interface, so that the mechanical arm can be moved "with just a thought or even a subconscious gesture, just like we do with our natural arm" (186). In "Locked In", the protagonist, Troy is a victim of the Locked-In Syndrome where the brain is

essentially disconnected from the rest of the body, allowing the victim to think normally but denying him the ability to utter even a single word. Equipped with a computer-brain interface, Troy embarks on his new journey in the company of The Monster, a digitally operated wheelchair with a robotic arm attached to its side. Troy learns to maneuver the chair with his thoughts and control its arm as if it were his own which to him looked like "a shiny mass of metal and cables in the form of a human limb without the skin. . . . The dexterous fingers . . . were the metallic equivalent of a disembodied magician's hand practicing the motions of a well-ingrained card trick" (10). The automatic transfer sequence enabled him to slide his body from the bed into the chair and back. The robotic arm steered the chair using a joystick and the brain interface allowed him to accelerate and brake. Eleven weeks after the stroke Troy returns to the normal world. Aiken cautions us about the possibility of sabotage as he describes one of Troy's colleagues hacking into the interface and tampering the voice simulation commands, jeopardizing Troy's safety.

The association between literature and medicine, as Charon (2000) puts it, "is enduring because it is inherent' (24). Aiken empathetically engages with his protagonists and interprets the world from the point of view of these disabled or ill patients. He treats illness as a "profoundly disruptive experience" (Bates, 2014, p.112) but also fantasizes about the varied ways in which the disabled can reconstruct their identities with the help of technological augmentation. He also contemplates about the existential nature of human life and how technology can revamp our understanding and knowledge of the meaning of life and death. "A Time to Every Purpose" explores the possibilities of nanotechnology in generating advances in medicine. Wearable interactive technologies like nanofiber suits equipped with BCI, like the one worn by the protagonist, Samuel Hawkins transforms him from paralysis to a functional quadriplegic. Technology and the knowledge explosion that it brings in its wake have changed popular perception of disability. Microscopic fibres in the nanofibre suit slide over each other, contracting and relaxing like muscles. The result is a form fitting device that functions like an external exoskeleton that is lightweight, comfortable, functional and inconspicuous. Aiken envisions

a level of sophistication that would inspire generations of scientists and technologists to take their research on to the next level where the disabled and the terminally ill can reap the benefits of their labour. Brain-computer Interface allows quadriplegic patients to control computer cursors, robotic arms and wheelchairs with the help of computer chips embedded on the surface of their brains and connected to a computer that can analyse and interpret their thoughts and act accordingly.

Robotics has transcended the realm of science fiction to become an inseparable part of modern medical technology and industry. In the story "Done That, Never Been There", Dr Bennett performs a telerobotic surgery on a patient in Moon Base Alpha, all the while "strapped into the VR hair that controls the surgical robot bolted into the floor of the operating theater on MBA" (46). With the help of computerized machines with robotic arms, surgeons can now perform operations through tiny incisions on the patient's body, thereby minimizing tissue damage. Surgeons can link themselves to these machines via an internet connection and operate on patients in distant locations. According to Aiken, telerobotic surgery "holds the promise of allowing surgery not only in rural areas, but even aboard ships – on the ocean, in outer space – and perhaps on the first Mars colony. Emergency medical care will be within reach even when the doctor is not in" (183).

Human fascination with Artificial Intelligence has culminated in the creation of smart machines with superior strength and intelligence. The presence of automated beings in our midst has forever changed the way we interact with our physical environment. At the same time, this has also altered our perception of humanity as an autonomous entity. The boundary between the organic and the inorganic is being increasingly blurred with the inception of bionic parts into the human frame. Intelligent machines indistinguishable from humans in physical appearance have challenged our notions of sovereignty, raising pertinent questions regarding the ethical treatment of these electronic beings. It remains a matter of grave contemplation whether to treat these smart machines in human form to equal rights as human beings. Alan Foster, the protagonist of the story "If He Only Had a Brain",

believes that machines should never be allowed to enjoy equal rights as humans for the dividing line between man and machine, according to him, is the human brain. Aiken presents the possibility of replacing a failing brain with an android brain and thereby reanimating the body of a deceased individual. Aiken alludes to the collective paranoia surrounding robots that resemble humans in outward appearance. Even though they are sentient beings programmed to have humanity's interest secured and protected, ". . . given free will, they will no longer be compelled to advance the interest of humanity. They will find us flawed, because we are. They will find us an impediment to their progress, because we will be. They will lead us to our demise, because we will only be in their way," (128) observes Foster.

Advanced brain mapping technologies would enable making digital copies of the human brain, turning every thought into data and transferring it to a computer file. Robin Cook depicts a similar underwater civilization in *Abduction* that had evolved to the point of transferring their memories to new, young bodies on death and thus enjoying an immortal existence. Aiken also refers to the prospects of using advanced medical technology to make the human body stronger and healthier in the future. These advances include the use of nanobots to clean and repair the vascular system, infusing weakened bones with titanium nanofibres to strengthen them and replacing worn organs with bionic kidneys, livers, hearts and lungs. "And with each rejuvenation we become more synthetic" (140).

The ethical debate over cloning emerged soon after science fiction writers explored the possibilities of cloned life. Scientific technology has transformed notions about the origin of life and presented the world with novel ways of conceiving life in a petri dish. Cloning humans is well within the realm of future possibility. In "The Last Clone", says Aiken, "the issue of *can we* has been leap-frogged, the issue of *should we* is alluded to, and the issue of *Well if we can, but if it's really, really expensive, who should have the right to do it?* becomes the center of the story" (187). The potential of nanomedicine to rejuvenate aging bodies and cure life-threatening diseases is reiterated in this story. Chronobots capable of resetting every cell in the body to the condition they were in at a chronological

age of twenty-one, end aging and disease world-wide, bestowing humans with eternal life. Hospitals treated only trauma victims and children. Ezekiel Kuperman, the last surviving clone, awaits release from a miserable life, withering away, waiting to die. Aiken envisions a future where brain mapping and data transfer technologies would merge the clones with their parents. The conception and meaning of life and death change with the inception of nanotechnology in healthcare. Aiken addresses the ethical consequences of cloning, a privilege accessible only to the wealthiest of the race. The story presents the predicament of Kuperman who had spent all his fortune on creating his clone, but ends up with a painful deteriorating body as each successive generation of clones aged more quickly than the last, a condition termed as the law of secondary degeneration. Chronobots did not function in cloned bodies leaving Kuperman to languish in a hospital, destined to be "the last man to die of old age" (122) while the rest of humanity enjoyed eternal life. Even as scientists and doctors believe in the potential of nanomedicine to revolutionize the medical industry in the near future, the ethical repercussions and implications of toying with life is a vehemently debated issue in contemporary cultural discourses.

Advances in medical research have brought about a paradigm shift in patient care and treatment. Nanoscience is widely regarded as the "next natural progression in scientific evolution – controlling the world from within it smallest structures. And nowhere was that idea more intriguing than in medicine" (Aiken 106).With Richard Feynman's treatise *There's Plenty of Room at the Bottom* in 1959, the scientific community began to seriously consider the prospects of nanoscience in improving the quality of human existence. Feynman talked about the possibility of using big tools to make small tools which in turn could make smaller tools down to a microscopic scale. Though still in its infancy, medical research into the use of nanomolecules in the production of new drugs and in generating an effective drug delivery system is revolutionizing patient care and medical practice. Aiken's story "Hiding from Nobel" explores the future possibilities and potency of nanomedicine research like the development of submicroscopic machines that could analyse and repair cell damage and nanities that could keep the body healthy and young as long as you lived.

In "Once, on a Blue Moon" Aiken shifts his focus on to biological warfare. Human knowledge of virology and bacteriology has advanced substantially in the recent century. This knowledge has bestowed man with the potential to produce and proliferate potent and effective bioweapons that can cause disease, death and destruction on a global scale. With the capacity to produce dangerous organisms at his disposal, humanity should discover more effective ways of controlling and regulating what they have produced. However popular fiction is replete with sabotage and bio terror narratives, cautioning us to the implications of tampering with the natural order which might lead to disastrous consequences. "Once, on a Blue Moon" presents a futuristic scenario where the mistake of a single man accidently wipes out the entire human race. Devlin Hatch, revered for his work in virology "as the man who conquered the common cold and a half-dozen other maladies" (144) had designed the deadly virus that mutated with every generation, turning it into a perfect weapon for biological warfare: "It's not one disease, it's a never ending cycle of destruction; an automatic weapon that continuously reloads itself" (145). As a bioweapons researcher, Hatch had been hopeful of finding ways to contain such a potent agent and also to immunize citizens against it. The laboratory was housed in Peach Island, which was considered to be the most secure facility in the world, but one which sat directly on a fault line that had been dormant for centuries. The tremor breached the containment field that isolated the Hatch virus and within hours the first death is reported. The virus survives on dust particles travelling with the breeze and spreads all across the globe at an alarming rate. Assessing the threat, Hatch and a team comprising of geologists, engineers, chemists, astronauts, machinists, a botanist and a base physician are quickly escorted to the Moon Base before contamination could reach them. However the devastation is complete and Hatch is filled with remorse as he gazes lovingly at the dying planet from the safety of the distant moon: "I should have been down there with all of them, not up here looking over them like some vindictive God who destroyed his creation. I am the last one who deserved to be saved" (147). The view of the dead planet tortures him as he had always dreamt of a life dedicated to the service of humanity. He had counted on his ability to make a difference, not just for a handful of people, but

for the future of the world. But now he had inadvertently unleashed a terror on his beloved world and transformed it into a wasteland of "11 billion rotting corpses, and animal carcasses far exceeding that number, strewn across every continent" (147). The only option available to these last survivors was "to wait for the virus to run out of food and die off on its own" (151). Devlin's last hope of redemption are the probes that he had sent to the distant planets containing human RNA, amino acid-base pairs and nutrients - the building blocks that would allow life to evolve in those distant planets in a few thousand years. Devlin stays back and launches the last of the probes manually as the last shuttle leaves for Earth. As Devlin drifts into outer space he wonders what the next generation of humanity would be like as and when it evolved on a distant planet. Even as medical science takes pride in its potential to rid the world of contagions and other fatal maladies, the unscrupulous use of biotechnology would unleash a terror of unimaginable proportions on an unsuspecting race. Potent biological agents created artificially and stored inside containment facilities pose a grave threat to the future of life on the planet.

Man's greed for power, fame and wealth has transcended the known confines of rationality and ethical well-being. Modern advances in science and technology have invested in man an arrogant sense of pride in his ability to tamper with life, both human and non-human. With immense power and knowledge at his disposal, interventions into the natural order of things have become the norm in the current century. The result of these audacious endeavours is felt more acutely in the health industry in the form of enhancement revolution, gene-editing technologies, cloning, nanomedicine, xenotransplantation, bionic organs and brain-computer interfaces. The human body has become the favoured object of scientific and technological explorations. Medicine has been transformed into big business and the profit motive that has crept into the health care industry has jeopardized the quality of patient care. Only a fortunate few have access to the best health care that science can provide. The level of medical care that modern science offers with its incredible array of cutting edge diagnostic tools, costly therapies and sophisticated prosthetic equipment has made health care expensive and unaffordable

to a huge section of the human population. Science fiction writers have fantasized about the ethical implications of the astronomical rise in the cost of medical care when it would become nearly impossible to provide medical aid to everyone in an equal measure. " "The Last Clone" deals with one aspect of this, when an extraordinarily expensive method of human cloning is developed to extend the lives of only the wealthiest few in society. And "Questioning the Tree" takes a look at one of the potential fallout issues of trying to decrease the cost of medical care by mechanizing and over-regulating a health care system, relegating health care delivery to computers rather than physicians", observes Aiken as he ruminates on the invasion of modern medicine by science fiction (190).

Aiken redefines doctor-patient relationship in "Questioning the Tree". The story presents the alarming prospect of technology dictating the terms of patient care, diminishing the role of the physician rather than augmenting his capabilities. Aiken intended this story as a "tongue-in-cheek caricaturization of this type of technocentric system of health care, flavoured with the paranoia of a litigation system run amok" (17). The future of patient care would strip doctors of their sense of empathy, forcing them to perform in a legislated way – forbidden to even touch the patient during examination and even surgery. High definition scanners, faster and more accurate, completely disregard the emotions and feelings of the patient. Even as the same pathology causes different symptoms and different degrees of pain in different people, the physician is distanced from the patient in the new mechanized system and also prohibited from empathizing with the patient and offering him personalized treatment. The Board of Medicine in the imagined future that Aiken portrays in the story infiltrated medical practices with young trainees who were trying to "weed out doctors who didn't follow the rules" (20). Aiken observes that the computerization has revolutionized medical care in the recent decades allowing physicians to diagnose and treat diseases that they could "only guess about not so long ago. . . . identify problems before it is too late." (190-91). The new generation of health professionals placed absolute faith in their machines and did not believe that a doctor could detect something that an elaborate scanner could not. The sense

of empathy that made physicians humane in their approach to the sick was uncalled for in the new techno-centric system of medical care.

"Questioning the Tree" is an interesting take on the dehumanization that has crept into the health industry. The new system has made it mandatory that the doctors order certain tests and procedures based on government protocol, especially in the United States, "where each medical decision made must be weighed against the risk of a law suit" (191). Doctors were allowed to offer only "specifically scripted responses to questions that were always variations of the same things" (17). Physicians were advised against giving personal responses to patient queries and any violation of the answer tree was considered a federal offense. The story presents an alternate scenario where a group of doctors offer clandestine personalized care to patients in agony, risking discovery and prosecution. They treat patients the old fashioned way instead of the way they are legislated to perform. Aiken believes that this complex state of affairs is reshaping the lives of physicians and patients all across America. "When we remove the physician's ability to allow critical thinking to guide patient care and replace it with computerized protocols in an attempt to standardize care and avoid errors, are we making that care better or worse?", Aiken asks pointedly (191). As the medical establishment proudly gloats over the benefits of new age innovations in medical research, the resultant transformation in the way health care is practiced creates an ever increasing disparity in access to ground-breaking treatments. The dissemination of medical information technologies and its application in patient care has made cutting-edge treatments affordable only to the wealthy.

Modern medicine, undeniably, entertains existential musings on the meaning of life and death. The dehumanization that has crept into the health care system has become the theme of Robin Cook's medical fiction over the past several decades. The subsequent commercialization of medical research and patient care has reduced the human body from an autonomous entity bearing an organic identity to a hybrid entity bearing the unmistakable stamp of technological interventions. Aiken's stories reveal how the attention of physicians shift perceptibly from patients to the machines at their disposal, profit

motive dictating the terms of health care delivered. An atmosphere of ethical apprehension and moral uncertainty marks the practice of modern medicine. In the introduction to *Medical Humanities*, Cole, Carlin and Carson (2014) observe that medical humanities has its origins when William Osler (1849–1919) and John Shaw Billings (1838–1913) looked for a way of preventing science and business from taking the "soul" out of medicine. They point out that bioethics covers many of the overlapping concerns of medical humanities: "Since the 1960s, the new fields of bioethics and medical humanities have grappled with problematic issues such as the protection of research subjects, the goals of health care, the definition of death, the rights of patients, the cessation of treatment, the meaning of illness, and the distribution of health care resources" (16). Medical Humanities strives to raise consciousness amongst medical practitioners and the general public about the humane and ethical aspects of health care. Cole et al (2014) alludes to the neurosurgeon, Harvey Cushing's yearning for an "idealized medical culture that was irrevocably lost". He quotes Cushing thus: "Medicine has become so scattered and subdivided that there is a crying need for someone to lead it from the wilderness and bind it together" (19).

Innovations in medicine and health care appeal to the ethical consciousness of the world, encompassing the whole of humanity. Science fiction envisions a single planetary society built on the strong foundations of technological evolution. The lived reality of contemporary techno-centric culture is explored in science fictional narratives with astounding precision. Brad Aiken in his collection of medical science fictional stories envisions sociological contexts, several decades and, at times, centuries into the future of humanity when technological and scientific advances would have revolutionized every known facet of mortal existence. Eternal life, body rejuvenation and augmentation with the aid of biotechnology would redefine our understanding of life and death. Science fiction predicts medical advances that would enable humans to transcend the barriers of time and space and evolve into a species blessed with a prolonged life span, eternal youth and even immortality. The ethical quandary brought about by recent explorations in medical research has awakened

humanity towards an awareness of the need to practice restrain and caution when it comes to the use of cutting-edge technology for the treatment of diseases and also for the improvement of the quality of general living.

Posthumanism explores the connection between human beings and technology and its ramifications on the nature of human existence. Technology has conjured up the potential for extended living, wherein humans could prolong life by augmenting their bodies and also by evolving into a disembodied existence. Humans transcending the temporality of bodily existence and existing as a virtually embodied entity has been one of the favourite tropes in contemporary science fiction. Science fiction writers have constantly contemplated the possibilities of distilling the human essence in some virtual form. The exploration of these possibilities begins with the human body which is the most coveted property of medicine. Aiken's short fiction dwells on the enthralling prospects of innovation in medical research and health care. The idea of human autonomy, free-will, consciousness and identity in the context of technological disembodiment or displacement have become themes of heated debate in the posthuman discourse. Technology has helped humans transcend the boundaries of body and mind, human and the non-human, and the organic and the inorganic. To some transhumanist theorists the posthuman would be a technologically sheathed entity, "a cyborg-entity inhabiting data-space, enjoying a computationally generated consciousness unconstrained by the physics of materiality and the pressures of mortality" (Pepperell 30). Humanity would evolve into hybrid entities as medicine capitalizes on the prospects of animal-human and man-machine interfaces. This would drastically redefine our notions of what it means to be human in the techno-scientific age. As we lose the supremacy over our organic bodies and negotiate other realms of existence, human identity becomes fluid and debatable.

Medical humanities, as it explores the consequences of technological determinism, fantasizes about a future where humanity would migrate onto the realm of posthumanism, fusing its organic body with machine parts and becoming what Francis Fukuyama (2002) calls the biotechnologically mutated non-human. Medical science fiction

stories predict a wide range of innovative and invasive techniques to facilitate better medical care in future times. Technological intervention in the realm of health care reorients popular perception regarding the quality of human life, both as an individual and as a species. The attendant ethical consequences of dehumanizing patient care and the future of doctor-patient relationship as we rely on machines for diagnosis are extrapolated with great clarity and precision in Aiken's collection of stories. Technological and scientific progress would undoubtedly determine the nature and essence of healthy living in the days to come. Futuristic explorations in medical research hold the promise of transmuting the known realities of mortal existence. Medical science fiction stories acquaint the public with the immense potential of technologically empowered therapeutic and preventive medicine and at the same time, also raise pertinent questions regarding the meaning and value of human life. They explore the possibilities of transcending the limitations of disabled bodies with the help of augmenting technologies and bionics, curing fatal diseases with advanced genomics and preserving the human essence in the digital form to ensure extended life and even immortality. Medical science fiction stories thus contemplate future figurations of humanity; re-imagining posthuman subjectivities and identities in the wake of techno-scientific advances in medical research and health care. The posthuman discourse, even as it acknowledges the possibilities of an augmented and extended life for humanity in the near future, ruminates on the need to preserve the sanctity of human life and the natural order of things in our familiar world.

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Dr Lekshmi R. Nair
Associate Professor of English
Government College Kottayam
India
Pin: 686 013
Ph: +91 9846440008
email: lekshmirnair@gckottayam.ac.in

Dr Moncy Mathew
Associate Professor of English
Government Arts and Science College Kozhikode
India
Pin: 673 018
Ph: +91 9846117196
email: moncymathew3@gmail.com