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Assignment 03

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2057 - Michio Kaku: The Body

The documentary 2057 - Michio Kaku: The Body imagined a world where healthcare is transformed by technological marvels: nanobots repairing tissues, holographic doctors diagnosing patients, and lab grown organs replacing the need for donors. These visions, bold and ambitious, reflected a future where medicine becomes truly magical. In 2024 some of these predictions have inched closer to reality, though others remain figments of our imagination. Progress as always, has taken unexpected paths.

Nanotechnology for instance has started to reshape the way diseases are treated. In cancer therapy nanoparticles are used to deliver chemotherapy drugs directly to tumors, sparing healthy cells from the collateral damage of traditional treatments. Scientists at MIT recently developed “smart” nanoparticles capable of releasing drugs only in the presence of specific enzymes found in cancerous tissue. While the documentary foresaw nanobots performing surgeries independently inside the body, today’s advances are focused on targeted treatments that reduce side effects and improve recovery times. The dream of robots repairing cells is still distant but the groundwork has definitely been laid.

Wearable devices have taken healthcare monitoring far beyond the spectrum. The Apple Watch detects irregular heart rhythms, alerting users to potential atrial fibrillation before they experience symptoms. In Sweden tiny implantable chips allow individuals to monitor their vital signs and store medical information. These technologies, though less visually striking than “smart clothing” predicted in the documentary, have enabled widespread use of health data giving individuals the tools to manage their conditions in real time. Continuous glucose monitors used by diabetes patients demonstrate how wearables have evolved into life saving tools, tracking glucose levels every few minutes and providing alerts to prevent dangerous spikes or drops.

Artificial intelligence has made significant contributions to healthcare, boosting accuracy and operational efficiency in ways that align with the documentary's vision. In medical imaging algorithms like Google's DeepMind analyze X-rays and MRIs with a correctness that matches, and in some cases exceeds that of human radiologists. At Stanford University an AI model was trained to identify skin cancer, achieving diagnostic precision comparable to dermatologists after being fed millions of images. In surgery the da Vinci Surgical System combines human expertise with robotic refinement, allowing surgeons to perform minimally invasive procedures. The machine's robotic arms mimic the surgeon's hand movements but at a meticulous level impossible for the human body.

In light of these progressions, ethical challenges have surfaced that demand careful consideration. One prominent example involves the use of predictive analytics in insurance underwriting. AI algorithms assess a person's likelihood of developing certain conditions, but this can lead to discrimination against individuals with higher health risks. For example, an investigation revealed that certain systems were recommending increased premiums for individuals based on factors like genetic predispositions and socioeconomic status, raising concerns about fairness and access to coverage. Such cases display the broader ethical questions surrounding the use of personal health data and how it shapes decisions in insurance and care delivery.

The future portrayed in 2057 hinted at boundless possibilities, yet today's reality reminds us of technology's dual nature. AI and robotics continue to make medicine more accurate and performative. However, the growing reliance on these tools presents new challenges; from biases in algorithms to unequal distribution of resources. These issues compel society to weigh the costs and benefits of advancement carefully, balancing technological progress with the principles of uniform treatment and equal opportunity. As healthcare evolves it will reflect both humanity's aspirations and the sophistications that arise when pushing the boundaries of science and ethics.

Works Cited

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