

How far medical treatment and technology is going to change in the future

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The future of medicine is undoubtedly one of the most crucial but concerning topics in today's society. However, with new technology helping us develop new antibiotics, surgical machines, AI doctors and wearable medical sensors, (as well as microbiology and genetic engineering developments), these advancements in medical research, will likely create a progression of old medicines and brand-new ones which is starting to increase more than ever.

Firstly, I will start by explaining which methods and potential futuristic ideas are being developed currently to improve our medical future. There have been many ideas about changing our medical future for the better, which include concepts ranging from AI doctors to Neuroprosthetics. An example of these are the AI doctors which are currently being developed in the USA and the UK. These AI doctors, despite being very expensive would be immensely beneficial for Nurses, Doctors, and Surgeons because of how effective they could potentially be. One way they would be beneficial is because of how accurate they can be with their diagnosis and due to the AI doctor being a robot, any human error disappears. Due to this, they could be very helpful surgical assistants for example. These AI doctors could be extremely useful to hospitals and surgical practices as there seems to be a shortage of doctors and surgeons across the UK currently. Moreover, on the topic of robotics and AI, there is another futuristic idea which is currently being used across the UK in many of the largest hospital and surgical practices. The Da Vinci Xi is a surgical machine allowing surgeons to make precise surgical procedures with a reduced chance for error. However, it is outrageously expensive, being sold at ' 2million dollars' each and some of the attachments

selling for '\$3000 to \$6000 dollars each. 'However, if we ignore the cost and think about the positives I believe that the positives outweigh the cost.

Another futuristic concept is the newly created organs on chips which are small chips that have the capability to mimic certain sections of various organs, for example, an alveolus, this is an alternative to organ transplants. They have been successfully developed and tested in these labs and are now predicted to be put into use near ' 2020'. The testing for these chips has cost Harvard's Wyss Institution around ' 37million dollars so far on research towards these organs on chips. ' Another concept is Nanobots which are microdevices that can keep track of an individual's health from their bloodstream, scanning cancerous cells, pathogens and many more. Recently a ' 250nm by 5nm propeller' was tested inside an individual's blood flow and this experiment resulted in success, but if we are to eventually use these nanobots as part of everyday life, we would be waiting for around 10-15 years according to the interesting engineer written by Trevor English an engineer. By ' 2030, if these nanobots are being used successfully then these nanobots would probably be streaming through our blood flow. ' The final concept I will be discussing is the ' wearable sensor' or commonly known as the ' medical tattoo', this sensor with a ' thickness of 0. 8 millimeters at the widest', as long as a small rubber. These sensors are made from a ' thin mesh of silicon, actually nestles in to the grooves and creases in your skin, '5 (hurst, 2013) These sensors would be able to help us overlook particularly fragile patients once their treatment has stopped, this enables doctors and nurses to act quickly if the sensor reads any serious issues

regarding the individuals health. Secondly, I will be analysing how these futuristic medical ideas work and could potentially benefit mankind in many years to come. Organs on chips have been a main focus in today's medical research labs, these chips are believed to be a huge stepping stone in medical research. Recently Harvard University has started creating the organs on chips with success, these organs on chips are able to ' replicate the bodies function. ' This huge leap has resulted in the first effective lung on a chip. The way this works is using microengineering, the design of the chip is also key and results in the chip being able to breathe, for example like an alveolus, which are in our lungs. In the center on this chip, there is a ' one cell thick membrane which allows the white blood cells to pass through with ease to treat and destroys any bacteria on the lung cells. ' Above this membrane is a layer of lungs cells which enable respiration to take place (airway) and below the membrane are capillary cells, this enables the blood to flow naturally. This type of chip can be inserted into the body if there is any organ failure or destruction. This is a huge positive because not only are they as effective as normal tissue made features but because the body doesn't reject them like normal organ transplants, reducing the need for organ transplants. However, despite these encourage advantages there are a few negative impacts of the organs on chips, one of these being the potential difficulty to analyse data as it can be ' affected by the absorption of products of interest on the inner linings' of the chip. This disadvantage could possibly cause minor and in some occasions major issues towards the analysis of the results. Another negative towards the chip is the inability for it to be portable and the expense of the stem cells required. In order to get a

' reliable analysis, bulky tools sometimes need to be used for pluripotent induced stem cells processing for instance, ' not only would it be expensive but would take up a lot of time and effort to regain the information analysed.

Another futuristic concept is the Da Vinci XI, this is a surgical machine which could have a huge impact upon the medical field, because of the reduced chance of human error, and due to this reason, they are now being used and operated across the UK, USA, and many other countries. This surgical machine can be used for any surgery or treatment known and can complete the specific surgery with ' 20% more accuracy than human surgeons. ' This increase in accuracy helps reduce recovery time, danger of human error and any other variables. ' The Da Vinci XI has 4 slim and long hands which enable it to maneuver around inside of the body with its 1cm tooled micro-hands. ' These micro-hands allow the machine to perform precise incisions in and outside of the body, due to the size of these hands the new machine is able to decrease the amount of space and size needed to perform specific types of surgical procedures. This will undoubtedly reduce recovery time (depending on the operation), therefore increasing the availability of hospital beds resulting in an increase of patients allowing to be treated for their various issues. The Da Vinci XI also has ' microscopic cameras (endoscope)' fitted onto each one of the hands allowing the surgeon controlling the machine would be able to see where to operate with ' 10x more accuracy' than a human surgeon. This will also help decrease the high risk of damaging any internal structures any error whilst operating on these tough angles and positions of the place of incision. Furthermore, with these surgical machines

and artificial organs being brought into the medical world it won't be long until AI doctors are brought into hospitals and surgical practices. These AI doctors would be able to monitor, analyse and treat patients effectively without making any errors. Despite the Da Vinci Xi being extremely accurate and least damaging way of getting safe surgery, there is still room for human error because of the operators running the machine. However, if AI doctors were introduced into hospitals and surgical practices, ' this percentage of human error would decrease dramatically. ' These AI doctors would be able to monitor and control surgical machines such as the Da Vinci Xi without making any calculation or any other mistakes. Another huge positive of AI doctors is ' once the programming and design are completed, replication would be easy' and with the increasing shortage of doctors, this could be the solution. These AI doctors could be hugely beneficial due to their accuracy and lack of error in assessing the problems of patients. However, since these AI doctors are a very new subject they could potentially be ' less accurate and reliable thereby putting patients at risk. ' Another risk of AI doctors is the issue of ' sensitive data, like addresses and financial and health information secure and keeping information safe. ' This can also cause problems when a surgery is required as the AI doctor will do what's best without considering the risks. This could obviously cause grave and serious problems for all patients. Despite being in the far future, many scientists in Nanotechnology have begun designing nanobots which would help control and discover any diseases, viruses etc. within our blood flow. These nanobots would be ' injected into our blood flow at any age (dependant on the individual) from where they would function inside of our bloodstream, ' These microbots

could witness the ' effects of antibiotics' helping us develop them further and they would also be able to ' destroy internal hemorrhages and damage' (on a small scale). These nanobots could possibly change our current way of creating antibiotics as these nanobots would be able to identify the disease/virus. These nanobots can identify if there is a new bacterium, virus, disease etc. and then ' transmits this result to the nearest medical center' allowing them to start developing some new antibiotics for the specific illness.

Another futuristic idea/concept is the newly researched and tested wearable sensors, these sensors would be like a tattoo, however, these tattoos would be a lot more beneficial and medically appealing due to the abilities they bear and the benefits they could have to our future medical lives. These medical/wearable sensors have the capability to closely monitor and report an individual's daily activity', whether it is a healthy report or a negative and potentially life-threatening issue to the individual's health, the ' sensor can identify these specific blips within the in person's body such as tracking hydration and temperature of the individual. These medical sensors have ' started to be tested on the elderly' who have a more delicate and vulnerable medical health. These sensors are used to alert the individual's Doctor to alert them of the situation taking place.

Another positive of the sensor is how it can ' store information from the previous year, '12 (Kohl, 2015) allowing any doctors or emergency workers to access the data and figure out what the problem is if there is an emergency. ' Or if the patient needs immediate assistance the sensor is able

to alert any nearby medical workers. This could be a huge benefit to people needing immediate assistance as the sensor will give them the information needed so they can prepare before even seeing the patient, this could save a lot of time and even enough to save a life. Today there are many different types of sensors related to our medical health but completely different compared to the medical sensor that is potentially going to be used in the future. These current sensors being used are not tattooable sensors they are mainly ' microsensors attached and located near veins to calculate heart rate'. These microsensors now are useful for finding heart rate and general everyday life statistics, they are not as helpful and beneficial to our medical health as one of these wearable sensors could be. With the increase in interest and research in the area, these sensors could become entwined into our societies sooner than we could possibly imagine.

After closely studying and analyzing my sources from which I have researched from, I have concluded that without a clear medical advancement ranging from AI doctors to organs on chips, in the future that without these advancements we will be in a big problem. Firstly, because of the reducing antibiotics and organ transplants and many other issues, these improvements are all that we will be able to rely on so that we are able to research and create further cures and concepts for the future beyond that. Despite the potential difficulties from the inhumane characteristics the AI doctor would hold to the potential occurrence of a malfunction of the nanobots whilst operating inside the bloodstream. But I believe that, despite these potential issues they could cause, without these concepts and ideas

acting as stepping stones into the far future we would be in a difficult situation in not only the near future but also the distant.

Finally, these concepts will be able to help us make surgical procedures, for example, a lot safer and accurate due to the lack of human error. Moreover, this is the similar outcome what could potentially happen with AI doctors and this could have a huge impact across our society is not only the medical world. Overall creating a more safe and reliable medical future allowing most people to put an end to their worries regarding their medical condition no matter the severity.