

Animation Script



How can wearable sensors help monitor health and tailor drug treatments?

Dr Netz Arroyo

To make the most out of this script, you could:

- Stick it in your book as a record of watching Netz's animation
- Pause the animation and make notes as you go
- Add your own illustrations to the sheet
- Create your own animation to accompany it
- Add notes from classroom discussions
- Make notes of areas you will investigate further
- Make notes of key words and definitions
- Add questions you would like answered – you can message Netz through the comments box at the bottom of his article:

www.futurumcareers.com/how-can-wearable-sensors-help-monitor-health-and-tailor-drug-treatments

SCRIPT:

Wearable technologies, such as smart watches and Fitbits, track our fitness by giving us real-time physiological measurements, such as heart rate, step count or blood pressure. However, some researchers believe that these devices have not yet reached their full potential.

Dr Netz Arroyo at the University of North Carolina Chapel Hill, USA, is developing wearable sensing devices called continuous molecular monitors, or CMMs, that can monitor our health on the go and in real time.

Netz hopes that CMMs will help our healthcare systems shift away from reactive medicine, where you get treated after becoming ill, to preventative medicine, where your health is monitored and steps are taken to stop you getting ill in the first place.

Doctors could also use CMMS to tailor treatments to individual patients and adjust the dosage of drugs or medicines based on each patient's unique physiological and medical needs.

.....

Currently, there is only one type CMM that is commercially available: the continuous glucose sensor. This sensor allows diabetics to monitor their treatment and make necessary adjustments by tracking their glucose levels at any time of the day or night.

However, the technology used in this sensor, which relies on a special enzyme called glucose oxidase, is unlikely to work for other health conditions. Luckily, Netz is busy developing a new type of CMM called an electrochemical aptamer-based sensor, otherwise known as an EAB sensor.

E-AB sensors contain an electrical conductor, such as a wire, which is coated with a modified piece of DNA or RNA called an aptamer, which is chosen for its ability to bind to a specific target, such as a drug, a virus or a cancerous cell. The aptamers are modified with a molecule called a redox reporter, which allows a small electrical current to be generated when the aptamer binds to its target. The amount of current that the E-AB sensor generates is directly proportional to the concentration of the target molecule within the body.

Currently, E-AB sensors can only be used continuously for 12 hours, but Netz is hoping to create sensors that can work for up to two weeks. Netz has licensed the technology so that new biotech companies can help improve the performance of the sensors.

By continuously monitoring health molecules in our bodies, E-AB sensors have the potential to not only better treat disease, but also to prevent it altogether.

What could you achieve as a biomedical engineer?