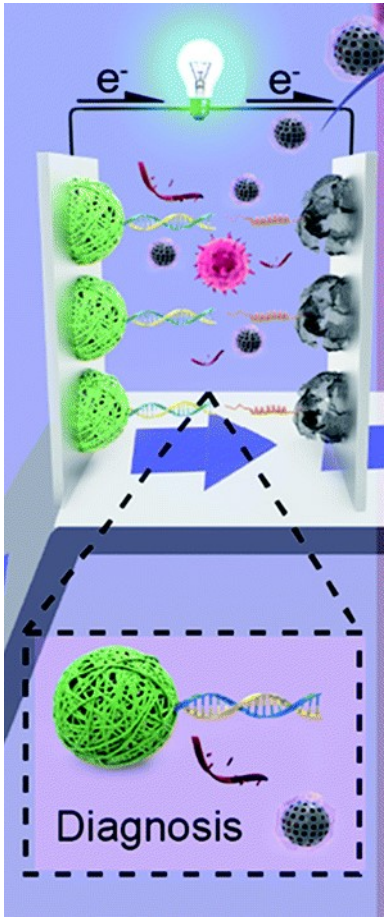
All-in-one – cancer diagnosis, treatment and evaluation

Read the full article at: rsc.li/2G10Rhp

Scientists have created an all-in-one biosensor to combat cancer from inside the body. The tiny device diagnoses cancer cells, releases an anticancer drug and then measures the drug's effect. The biosensor is powered by glucose and oxygen from the body.

Glucose is oxidised at an anode releasing electron. The anode is made from gold nanoparticles. Oxygen is reduced at the cathode, which is made from carbon. An anticancer drug is attached to the anode by a piece of DNA. When the drug leaves the anode to fight a cancer cell, the sensor detects an increase in power. The cancer cells are then killed by the drug. The dying cells release a protein which blocks electron transfer in the cathode. The decrease in power signals that the cancer treatment is working.



The diagnosis step in this three-step treatment

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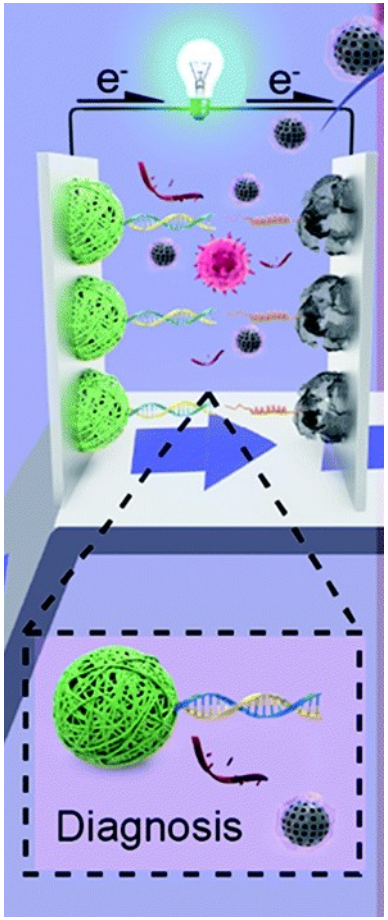

The diagnosis step in this three-step treatment

1. Glucose has the formula $C_6H_{12}O_6$. What elements does it contain?
2. Explain how gold conducts electricity.
3. What type of monomer makes up i) DNA ii) proteins?
4. Write a half equation for the reduction of oxygen to form water in acidic conditions.

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