Novel biosensor for use on teeth

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PRINCETON, NJ, USA: Princeton University researchers have successfully tested a special kind of biosensor that could help to prevent disease by detecting even small amounts of harmful bacteria more quickly than conventional methods. Using a “tattoo” made from silk and gold and attached to a cow’s tooth, they were able to transmit a signal wirelessly to a nearby receiver.

With the method, developed in collaboration with the US Air Force and the American Asthma Foundation, the researchers hope one day to be able to detect not only bacteria but also DNA or particular viruses. In lab tests conducted at Princeton’s School of Engineering and Applied Science this year, they were able to detect pathogens responsible for surgical infections and stomach ulcers, among others.

The signals are received from a gold antenna on a tattoo that is attached to an array of graphene—very small particles of carbon—that triggers a signal when in contact with bacteria through attached proteins called peptides. Therefore, the device does not require any power supply, the researchers said.

The sensor is held in place by a water-soluble silk base derived from insect cocoons. In this way, the researchers said, the sensor can be used on different kinds of biomaterials, like teeth or skin, and washed away or dissolved by body enzymes after use.

According to the researchers, there is still a long way to go before such a biosensor could be regular use, since the sensor is still too large to fit on human teeth and its lifetime and transmission distance are short. They admitted, however, that a few modifications to the design of the sensor could increase its transmission distance in the future.

Most traditional biosensors are based on substrates like silica, which makes them heavy and uncomfortable to wear.

Astra Tech backs up implant line

Astra Tech has presented new clinical data confirming the clinical effectiveness of its dental implant system. The results gathered through the company’s global research programme show almost 100 per cent survival rates for the company’s OsseoSpeed implants in sites like the posterior mandible.

Recent multicentre studies have also demonstrated the safety and predictability of OsseoSpeed 5 mm narrow implants and OsseoSpeed Profile implants, company officials said at the Astra Tech World Congress in May.

Since 2011, Astra Tech has been part of DENTSPLY, a US dental company that manufactures and distributes the ANKYLOS and XIVE implant systems through its German-based subsidiary DENTSPLY Friadent.

Biomaterial stimulates healing

A group of researchers from South Korea, Switzerland and the US has found that blood platelet biomaterial significantly improves the healing process after placement of dental implants. In a case study conducted in Italy, they observed beneficial short- and long-term results after the replacement of a fractured central incisor.

The material seems to act as a bio-membrane that protects the implant from the oral environment. It also appears to stimulate the growth of cells and to accelerate gingival healing and maturation. After seven days, they found that the gingival aesthetic profile was well defined. At six months, they reported a satisfactory final result that was still stable and aesthetic after two years.

According to the researchers, L-PBF is simple, inexpensive and easy to prepare in only 15 minutes. Moreover, it is free of additives, such as anticoagulant, a substance that prevents the clotting of blood, or chemicals for activation, they said.