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Intra-maxillary molecular delivery and blood monitoring via dental implant

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Due to lack of pulp structure and periodontal ligament (PDL), which are regarded as the mainly pain origins of tooth painful sensation, dental implant have the opportunity for painless molecular releasing and blood monitoring with long-term steady and continuous properties. The new pathway may allow functional peptides and even the bigger molecular releasing and monitoring, which is impossible to absorb throughout the gastrointestinal (GI) tract. Therefore, we design the replaceable drug delivery and bio-sensing modules above the titanium dental implant fixture which is immobile inside the maxillary bone marrow. The drug delivery module contains the piezoelectric micro-pump, the drug container and the power supply inside, while the bio-sensing module is constructed by the integrated circuit (IC), the Bluetooth module and the power supply. The total loading volume of the drug delivery module is around 0.5-1 ml and the drug is polymerized due to safety concern. Therefore the drug releasing type throughout this module is slowly and continuously diffused into the surrounding blood pool inside the bone marrow. The released drug type also needs to be carefully selected to avoid surrounding bony destructions. In contrast, the biosensor may provide various molecular types of continuous blood monitoring within five minute intervals and lasting for about 1 month within current technology. With standard dental and medical protocol establishments, the device may provide more useful applications in clinical practice.

Biography

Li Yu-Jung is currently a Lecturer at St. Mary's Medicine, Nursing and Management College. He has completed his training program of Oral and Maxillofacial Surgery in Veterans General Hospital-Taipei, Taiwan during 2002-2006. He is also a Doctoral candidate majored in Mechanical and Electrical Engineering from National Taipei University of Technology. He has received his MS degree of Clinical Dental Science from Institute of Clinical Dentistry, National Yang-Ming University. He has also received MS degrees of Chemistry and Biophysics from Graduate Institute of Biophysics, National Central University and Institute of Chemistry, Tamkang University during 2006-2010 and Bachelor's degree of Dentistry from Department of Dentistry, Chung Shan Medical University in 2002.

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