A painless device for long-term, continuous drug delivery and bio-sensing via dental implant

Li Yu-Jung
St. Mary’s Junior College of Medicine, Nursing and Management, Taiwan

Traditionally the tooth sensations are mainly from its inside pulp structure and outside periodontal ligament (PDL). However, both of them will be taken off while dental implant replacement and the fact may allow us to design the drug delivery and bio-sensing modules above it to reach the inside bone marrow and the surrounding blood pool. Such device may provide the application for long-term, painless and continuous drug delivery and bio-sensing. The drug delivery module is composed by the piezoelectric micro-pump, the drug container and the power supply battery. While the bio-sensor has integrated circuit (IC), Bluetooth 4.0 module and the power supply inside. The device may improve the life quality toward those patients with chronic and critical diseases suffering from frequently invasive procedures. For example, patients with diabetes mellitus (DM) may need four invasive blood sugar detection and subcutaneous injections of insulin to control blood sugar levels each day in the later stage traditionally. With such device, they may avoid such frequently invasive procedures. Currently the in vitro experiments, simulations and the preliminary canine study provide the positive results and such pathway is proven efficiency in medical and dental practice. However, the development of this device is just beginning and further improvements are needed to overcome the technical challenges including safety concern, module size minimizing and power supply prolong. Standard protocol establishment in dental and medical practice is also important. With proper improvement and technology support, the intra-oral device may provide further medical applications.

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.

richard513.tw@yahoo.com.tw

Notes: