

13th Global Diabetes Conference and Medicare Expo

August 08-10, 2016 Birmingham, UK

Regular and relatively painless blood glucose monitoring through intra-oral biosensors built in dental implants

Chih-Cheng Lu

National Taipei University of Technology, Taiwan

The current monitoring procedure of blood glucose for diabetes patients is typically invasive and thus cause pain. In this respect, we propose a novel biosensor configuration enabling recurrent and relatively painless blood glucose detection required for critical and chronic health care. This new concept mainly derives from the fact that in recent years dental implantation have become a mature clinical procedure without any pain in teeth and bone marrow. Hence, within a certified implant fixture, we designed the intra-oral amperometric biosensor for more convenient glucose monitoring. In the abstract, proper methods of drug polymerization and glucose oxidase (GOD) degradation are first investigated to assess the life time of the biosensor. Second the calibration process of the biosensor is carried out to evaluate its sensitivity and stability via C-V voltammogram. Extensive works are completed for interface circuits and miniature GOD-coated electrodes that can measure glucose concentrations up to 400 mg/dl. Besides a prototype module integrating the amperometric biosensor with a low-power bluetooth 4.0 communication chip to transmit the measured data is also successfully developed and tested. Also, additional functionalisation experiments implement the use of graphene-combined GOD electrodes to enhance the biosensor's sensitivity and selectivity. In summary, with constant improvements on such devices, the proposed innovational technical platform is able to bring about more regular and relatively painless blood glucose detection procedures for enormous diabetic or chronic patients worldwide, and more potential medi-care applications.

Biography

Chih-Cheng Lu has completed his PhD degree in Electrical Engineering at Engineering Department of Cambridge University, UK. He has served as an R&D Manager in Semiconductor Industrial Sectors from 2003 to 2005. He is currently a Professor at Institute of Mechatronic Engineering, National Taipei University of Technology, Taiwan, and the Supervisor of Advanced Microsystems and Devices Laboratory. His research interests includes MEMS, CMOS-MEMS smart sensors/actuators, bio-medical and magnetic microsensors, gene/drug delivery and multidisciplinary applications for IOT. He has authored and co-authored more than 70 journals and international conference papers in these areas since 2007 and has been a peer-reviewer for several internationally prominent journals.

cclu23@ntut.edu.tw

Notes: