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Professor M. U. S. Sultanbawa Award for Research in Chemistry

Awarded for the best research paper presented at the Annual Sessions of the Institute of Chemistry Ceylon, for work carried out and completed in Sri Lanka.

Professor M. U. S. Sultanbawa Award for Research in Chemistry- 2020

A novel immunoanalytical method for obesity biomarker detection using antibody functionalized silver nanoparticles

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Obesity is a serious health issue related with increased body fat content. Escalating numbers of patients have been reported worldwide throughout the recent past, associated with a high cost in the health care sector. Other than being a disease condition by itself, it also acts as a risk factor for many metabolic and cardiovascular diseases. There is no definitive treatment available and control of the disease is achieved via lifestyle modifications; hence, early detection of the risk to be obese is of paramount importance. Nevertheless, accurate diagnostic methods for obesity are not widely available in the current clinical setting due to the high cost and associated drawbacks. Utilization of 'leptin', which is an accurate indicator of body fat content, has gained the attention of researchers as a biomarker for obesity.[1] Therefore, this study was conducted with the aim of developing a novel immunoassay for the detection of leptin; a biomarker of obesity.

Leptin detection was done using an immunoanalytical method by surface functionalization of silver nanoparticles using anti-leptin antibodies.[2] Silver nanoparticles were synthesized by reduction of silver nitrate using sodium borohydride. Prepared silver nanoparticles were characterized using UV-Vis spectroscopy, dynamic light scattering (DLS) and scanning electron microscopy (SEM). The SPR peak was found to have a λ max of 405 nm with a FWHM of 72 nm and the average particle size was recorded as 40 nm. Bovine serum albumin (BSA) was used to stabilize the synthesized silver nanoparticles sterically and the optimum BSA concentration required was found to be 10 μg/ml. Synthesized nanoparticles were surface functionalized using anti-leptin antibodies which specifically bind with leptin. These antibody-nanoparticle conjugates were characterized by a currently used immunoassay technique named Enzyme Linked Immunosorbent Assay (ELISA), UV-Vis spectroscopy and SEM and corresponding data verified the successful functionalization. Optimum pH and antibody-nanoparticle ratio for this functionalization process were determined using ELISA and according to obtained results, pH 9.5 and 1:10 ratio were selected to be the best conditions. Detection principle of this novel assay was based on the immuno-aggregation of anti-leptin functionalized silver nanoparticles in the presence of leptin. Changes in surface plasmon resonance due to this leptin induced aggregation were manifested via UV-Vis spectroscopy and spectral changes in the absorption peak confirmed the leptin detection ability.

This nanoparticle based detection system could be used as an intermediate detection step for qualitative analysis of samples as positive or negative for leptin. It could be further developed as a novel method to measure body fat content thereby allowing the early diagnosis of the risk towards obesity. This study gives insight to a promising alternative method to existing detection

methods which are more expensive and time consuming.

Key words: Obesity, Leptin, Silver nanoparticles, Anti-leptin antibodies

References:

1. Shah, N. R.; Braverman, E. R., *PLoS One* **2012**, *7* (4), 1–8.
2. Endo, T.; Yamamura, S.; Nagatani, N.; Morita, Y.; Takamura, Y.; Tamiya, E., *Sci. Technol. Adv. Mater,* **2005**, *6*, 491–500.

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Long service awards - 2020

Dr. U S K Weliwegamage

Dr. U S K Weliwegamage joined the College of Chemical Sciences in 2005, as the first, full time and permanent Senior lecturer of the College of Chemical Sciences. Currently, he is the Acting Head of the Department of Allied Sciences, College of Chemical Sciences. His contribution to the advancement of the College of Chemical Sciences as well as the progress of the Graduateship in Chemistry programme has been enormous. He has served as the Assistant Treasurer and a Council member of the Institute of Chemistry Ceylon and as the Senior Students' Mentor, College of Chemical Sciences.

Long Service award is presented to Dr. U S K Weliwegamage in recognition of his valuable and devoted contribution over a period of 15 years.

Mr H L R H Abeyrathne

Mr. H L R Hasantha Abeyrathna joined the Institute of Chemistry in 2005, as a Laboratory Assistant. After successfully completing the Diploma in Laboratory Technology in Chemistry programme conducted by the Institute, he was promoted to the post of Laboratory Technician in 2008. In 2016, Mr. Abeyrathna was appointed as the Education Assistant, in which he continues his duties with great dedication to this date. In appreciation of over 15 years of devoted service to the Institute of Chemistry Ceylon, Mr. H L R Hasantha Abeyrathne is awarded with the Long service award.

Mrs. H L Anoma Champanie

Long service award is presented to Mrs. H L Anoma Champanie, in appreciation of her uninterrupted, dedicated and loyal service to the Institute of Chemistry Ceylon for 30 years. Mrs. Anoma Chamapanie joined the Institute in 1990, as a Trainee Accountant Clerk and was then promoted to the post of Senior Accounts Assistant in 1998. In 2008 she assumed duties of the post of Assistant accounting officer and was promoted to the post of Senior Accounting officer in 2013. From January 2020 she serves the Institute as the Assistant Finance Manager.