



Powerful sensor may help identify novel therapies for treating type 2 diabetes.

Providing micro and nano fabrication facilities for Australia's students, academics and industry

Access to cutting-edge fabrication and sensing techniques available through the Australian National Fabrication Facility (ANFF) have enabled Australian researchers to develop a state-of-the-art sensing platform to monitor the secretion of insulin.

Dr Jiangbo (Tim) Zhao, Associate Investigator of the Australian Research Council Centre of Excellence in Nanoscale Biophotonics and Research Associate at the University of Adelaide, said it was the first time that simultaneous monitoring of extracellular calcium ion (Ca²⁺) and insulin secretion had been achieved.

"The applications of this powerful microfluidic sensing platform will provide insights into the mechanisms underlying the secretion of insulin," said Dr Tongzhi Wu, the lead in medical aspects of the collaborative project, "and potentially lead to the discovery of new therapeutic targets for type 2 diabetes."

Collaborating with researchers from the University of South Australia's Future Industries Institute, Drs Zhao and Wu lead a multidisciplinary team across physics and medicine to gain fundamental knowledge that will improve the lives of people living with type 2 diabetes.

Working to advance their understanding and knowledge of the physiology and pathophysiology of pancreatic islets function, they aim to identify novel therapies to promote clinical interventions for people with type 2 diabetes.

They are optimistic that this will also interest pharmaceutical institutes or companies.

Dr Zhao said the ANFF network was unique in offering the perfect local alliance. The microfluidics development and optical sensing platform of this project were undertaken at ANFF-SA and Optofab Adelaide, respectively, together with the respective ANFF node leaders Associate Professor Craig Priest and Professor Heike Ebdendorff-Heidepriem.

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Dr Jiangbo Zhao

This close collaboration facilitated the smooth implementation of this team's research plan - and then the yield of research articles - without the need to travel interstate.

"Access to ANFF-SA facilities and their professional technical support team has enabled the fabrication of our state-of-the-art microfluidic device," said Dr Zhao.

"Coupled with ANFF Optofab, we have been able to incorporate multiple sensing

modalities into the sensor for its enhanced functions and performance."

Based on a series of fluidic dynamic simulations run by the PhD student Mr Weikun Huang, in consultation with ANFF-SA's fluidics simulation engineer Dr Moein Kashani, Dr Zhao and his team devised, fabricated, characterised, and validated the powerful microfluidic chip which mimics in vivo physiological conditions.

They have demonstrated the simultaneous and real-time sensing of Ca²⁺ and insulin and you can read more at bit.ly/3ILOAQu.

Co-located at the University of South Australia and Flinders University, ANFF-SA specialises in microfluidics, organic electronics, biomaterials, novel semiconductor materials and characterisation.

Providing leading-edge research capabilities, equipment and expertise, ANFF-SA is an open access facility for researchers, academics and industry which supports excellence in world-class science research and collaboration.

For more information visit anff-sa.com or contact Simon Doe on 8302 5226 or simon.doe@unisa.edu.au.

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