

# PNIRS Presents

S P E A K E R S E R I E S

featuring

**Mark Hutchinson, PhD, BSc**  
**University of Adelaide**

**JOIN US FOR A LIVE PRESENTATION AND Q&A**  
**Tuesday, November 7, 2023**  
**3:00 pm EST | 8:00 pm GMT | 6:30 am on November 8, ACDT**

Please [click here](#) to find your local time.

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*The KNOW program - a Human Integrated Sensor System powered by PNI*

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**Professor Hutchinson** is the Director of the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP), an Australian Research Council Future Fellow and a Professor within the Adelaide Medical School at the University of Adelaide. Mark is also President of Science and Technology Australia, the peak body in Australia that represents 145,000 scientists and technologists across academic, government and industry. Mark serves as the chair of the Safeguarding Australia through Biotechnology Response and Engagement (SABRE) Alliance, chair of the Davies Livestock Research Centre advisory board, a Ministerial appointment to the ARC CEO Advisory Council, a founding member of the Defence Science Technology Group STaR Shot for Operating in CBRN environments Advisory Council, an Associated Editor of Brain,

Behavior and Immunity and is a PNIRS board member.

Professor Hutchinson's research explores the "other brain" or the other 90% of cells in the brain and spinal cord. These immune-like cells are termed glia. Mark's research has implicated the brain immune-like cells in the action of drugs of dependence and the negative side effects of pain treatments. He has pioneered research which has led to the discovery of novel drug activity at innate immune receptors. His work has enabled the translation of compounds at the lab bench to clinical agents used at the bedside. The Neuroimmunopharmacology Laboratory at the University of Adelaide is a world-leading research team, whose main focus is to develop innovative technologies that allow for the early diagnosis and treatment of neurological diseases. Our innovation approach focuses on translational science, developing biomarkers and wearables for real-time monitoring and precision medicine interventions that are disease modifying.

Unveiling an interdisciplinary leap in human performance and threat detection, this presentation will introduce the KNOW program. Integrating psychoneuroimmunology (PNI) with state-of-the-art sensor technology and data analytic approaches, KNOW heralds the future of real-time, biologically informed alert systems for first responders and defence personnel. Leveraging the innate immune system's ancient molecular pattern recognition capabilities, this future wearable technology aims to provide real time, quantifiable data on biological threats. Traditional methods, reliant on non-deployable technology, have been marred by delayed response and jeopardised missions. In contrast, KNOW employs the mechanistic knowledge of the rapid cascade of PNI changes, detectable at both molecular and functional levels, thus cutting detection time from hours to minutes. Utilising existing and emerging technologies, the KNOW program aims to quantify innate immune response markers and neuronal system functions. Our integrated, data-science-backed approach translates these biological insights into digital models for immediate and actionable threat detection and prediction. Unlike existing solutions that detect pathogens directly, KNOW uses the magnified molecular and functional components of the immune response as sensors. The origins of the program's utility extends beyond defence. Our recent study on Australian Football League players identified blood-based biomarkers for predicting physical and cognitive performance, demonstrating the technology's broader applicability in diverse real-world scenarios. This could revolutionise performance monitoring and open new avenues in personalised precision health.