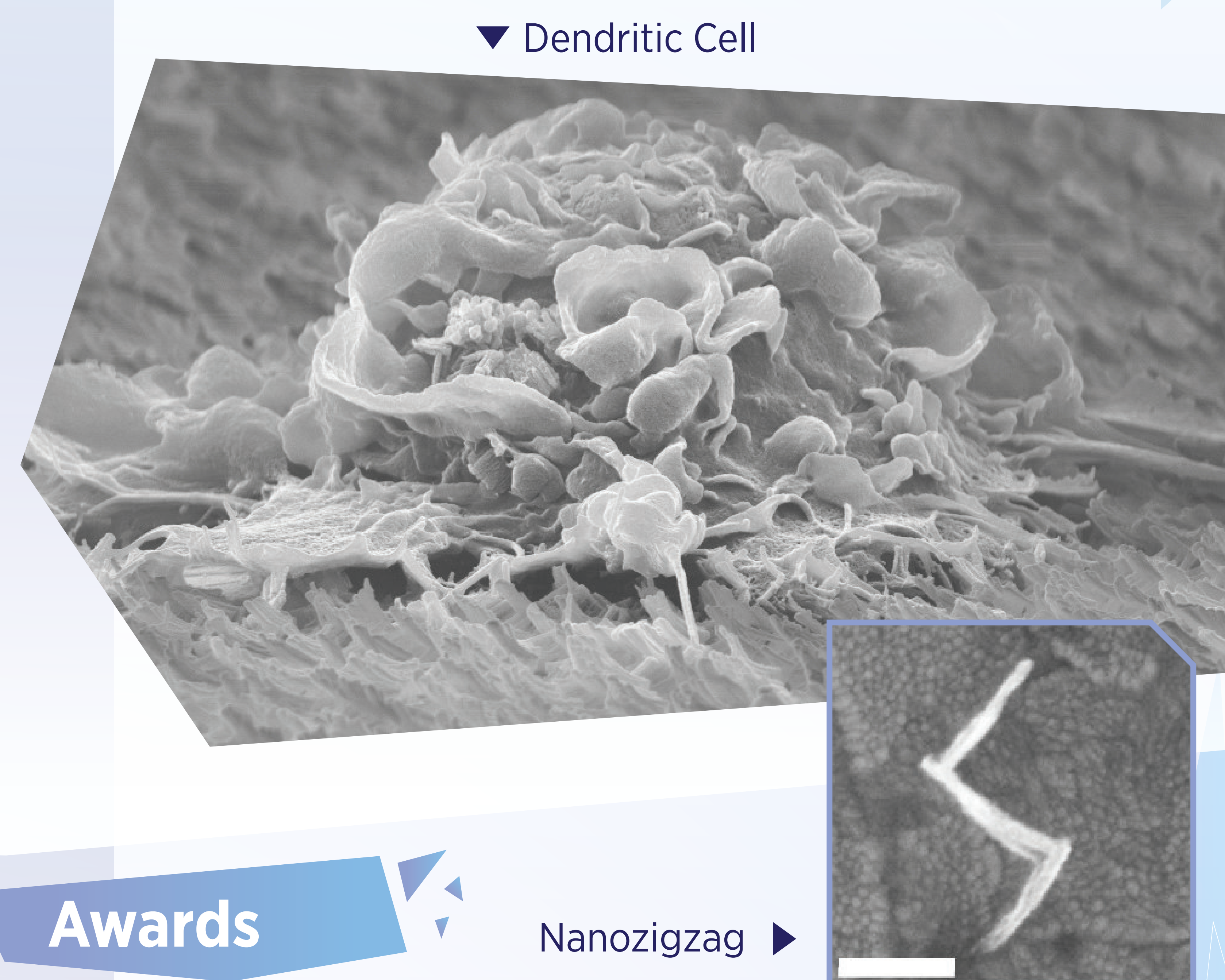


# Novel Biomaterials used for Dendritic Cell Vaccine for Cancer Immunotherapy

## Project Team

Prof Yung Kin Lam Ken (PI),  
Dr Huang Zhifeng, Dr Zhang Shiqing

Traditional cancer treatments often rely on cytotoxic agents. This invention offers a safer and more efficient biocompatible method of using extracellular silica nanozigzags (NZ) to mature dendritic cells (DC) *in vitro* through the mechanical activation of focal adhesion kinase (FAK) within DCs, enhancing the ability of NZs to activate immune cells and suppress tumour growth *in vivo*. This makes NZs a promising biomaterial for effective cancer immunotherapy, boosting the body's natural defences against cancer without the use of harmful chemicals.



▼ Dendritic Cell

## Features and Advantages

- 1 Improves therapeutic efficacy compared to conventional methods in terms of *in vitro* CTL activation and *in vivo* tumour suppression
- 2 A safer and more efficient alternative to existing chemical maturation agents which may have a higher risk of side effects
- 3 Biocompatible and with no cytotoxic effects observed during DC maturation
- 4 Enhances antigen uptake capacity
- 5 Novel method integrating nanotechnology with cellular immunology
- 6 Synergetic convergence of nanotechnology, immunology, and cellular engineering to address healthcare challenges

## Awards

Nanozigzag ▶

- ▶ Gold Medal and International Special Merit Award  
International Exhibition of Inventions of Geneva 2025
- ▶ Top 20 Best Invention Awards, Gold Medal and Special Award  
International Invention Innovation Competition in Canada 2025
- ▶ Gold Medal and WIPO National Award for Inventors  
Silicon Valley International Invention Festival 2025
- ▶ Gold Medal  
BRICS Invention 2025

