

SUCCESS STORY

Personalized Vaccines: Transforming Cancer Care

A new AI-powered method for programming the immune system has led to the creation of personalized vaccines for cancer patients and others.



Over the past two decades, artificial intelligence (AI) has reached numerous major milestones. These milestones have seen AI progress from making simulations with limited prediction accuracy to creating single annotated datasets, and now, generating extensive unannotated datasets.

A New Era of Generative AI

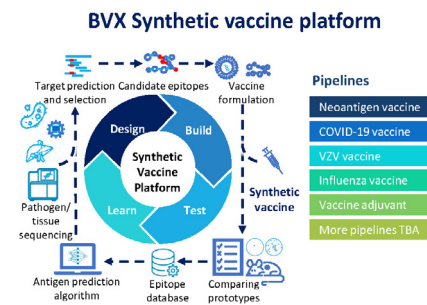
This new era of generative AI capability is revolutionizing biotechnology. For instance, generative AI has replaced the earlier trial and error research methods, which were limited to local solutions. Now, generative AI can consider multiple modal constraints and generate solutions with global applications.

Advanced AI is more user-friendly for biologists and easier to learn than previous iterations. This facilitates knowledge transfer and extrapolation of findings for use in multiple scenarios.

BayVax BioTech Limited

BayVax BioTech Limited, an HKU spin-off start-up company, is at the forefront of harnessing AI's new capabilities in biotech development. BayVax BioTech has used these advances to create an AI-powered method for programming the immune system to develop synthetic vaccines. These vaccines aim to prevent or treat immune-related diseases and are created using a unique technology

platform and antigen-predicting bioinformatics algorithms.



BayVax employs a vaccine formulation technology licensed from the University of Hong Kong. This technique, developed by Prof. Huang Jian-Dong and Dr. Hu Ye-Fan, involves designing a self-adjuvanting, self-assembling vaccine to induce antigen-specific immune responses. This patent was awarded a gold medal at the Geneva International Exhibition of Inventions 2023.

Cancer Vaccines from HKU

The company's most notable work to date has been in personalized therapeutic cancer vaccines. BayVax BioTech has developed a personalized neoantigen cancer vaccine. Neoantigens, considered the ID cards of cancer cells, are antigens newly created from specific cancer mutations. Each neoantigen vaccine is customized based on patient-specific mutations, allowing the vaccine to reprogram the immune system in vivo and promote immunity to eliminate cancer cells.

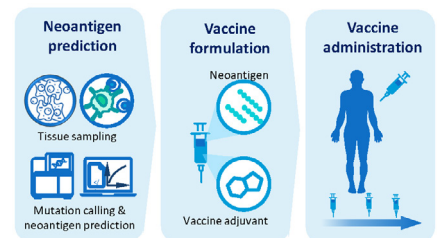
The vaccine is created following tissue sampling, mutation calling, and the

use of unique neoantigen prediction algorithms. The neoantigen vaccine can be customized to treat any patient, marking an exciting new era of cancer immunotherapy.

BayVax BioTech has initiated an Investigator-Initiated Trial (ITT) of a cancer vaccine in conjunction with HKU Shenzhen Hospital.

The company has also developed a high-performing COVID-19 vaccine based on antigen design and rapid iteration. Recently, this research was published in the high-impact journal Cell Host & Microbe, in collaboration with the University of Hong Kong.

Core Pipeline: individualized neoantigen cancer vaccine



HKU TTO supported the team by assisting with patent filing and licensing, as well as marketing and commercialization support, including showcasing the invention at the inaugural Asia Summit Global Health 2022 and at DreamOn, HKU's innovation and entrepreneurship event held in June 2023. The TTO team also assembled a lineup of investors and arranged funding support through TSSSU@HKU.

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