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Hong Kong develops innovative mRNA drug for treatment of nasopharyngeal carcinoma

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mRNA lipid nanoparticle induces detonation of Epstein-Barr virus-positive cancer cells



Nasopharyngeal carcinoma (NPC) is a cancer type strongly associated with Epstein-Barr virus (EBV) infection. The Chinese University of Hong Kong (CUHK)'s Faculty of Medicine (CU Medicine) saw the potential of EBV as a therapeutic target and successfully developed an innovative mRNA drug for treatment of NPC targeting EBV-carrying cancer cells.

Researchers observed promising outcomes in mouse model, suggesting that the novel drug can work in synergy with immunotherapy and serve as a treatment option for other EBV-associated cancer types.

NPC, known as "Canton tumour" due to its high prevalence in Southern China, is the most common head and neck cancer in Hong Kong.

Researchers from the Department of Anatomical and Cellular Pathology at CU Medicine collaborated with The Jackson Laboratory in the US to develop a synthetic mRNA drug to switch on an EBV-specific suicide mechanism to kill the NPC cancer cells. A lipid nanoparticle encapsulating nucleoside-modified mRNA which encodes an artificial transcriptional activator named mTZ3-LNP is synthesised for the mRNA-based EBV-targeted therapy.

The stage of NPC is an important prognostic factor influencing survival. The overall 5-year relative survival drops from over 90% at early stage to less than 50% at advanced stage. However, treatment options for NPC patients with advance disease or recurrent and metastasis tumours are limited as targeted therapy for NPC-specific mutations is not yet available.