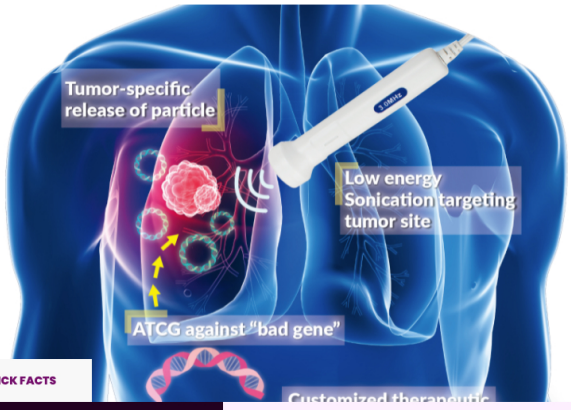
A Novel Virus-Free Anticancer Gene Therapy

#Genetic #Treatment #Award



PROJECT QUICK FACTS

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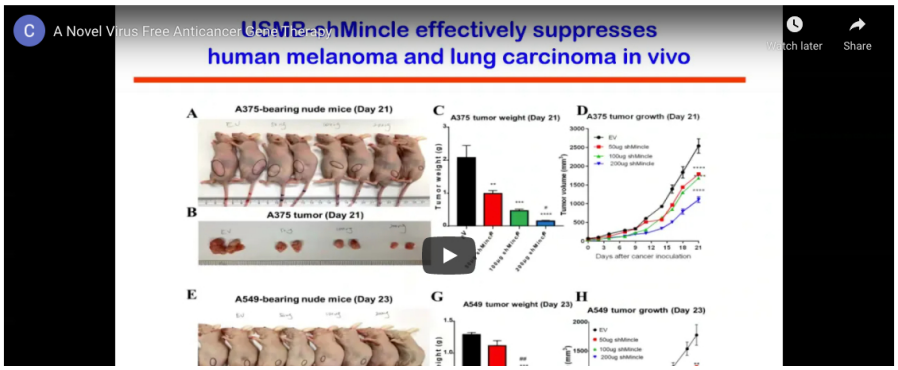
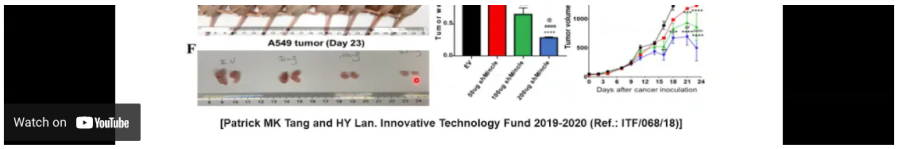
- **Funding Sources**
  Innovation and Technology Commission, Research Grants Council, The Chinese University of Hong Kong Faculty of Medicine, Guangdong Science and Technology, The Lui Che Woo Institute of Innovative Medicine
- **Publication**
  Li C, Xue VW, Wang QM, Lian GY, Huang XR, Lee TL, To KF, Tang PM, Lan HY. The Mincle/Syk/NF-kappaB Signaling Circuit Is Essential for Maintaining the Protumoral Activities of Tumor-Associated Macrophages. Cancer Immunol Res. 2020 Aug;8(8):1004-1017.
- **Patent**
  1 US Provisional Filed and 1 Hong Kong Application
- **Award**
  Gold Medal with Congratulations of the Jury, International Exhibition of Inventions Geneva 2021

Gene therapy conventionally utilizes virus to correct diseased genes for eliminating cancer, but safety risks and off-target effects of viral method largely limit their clinical translation.

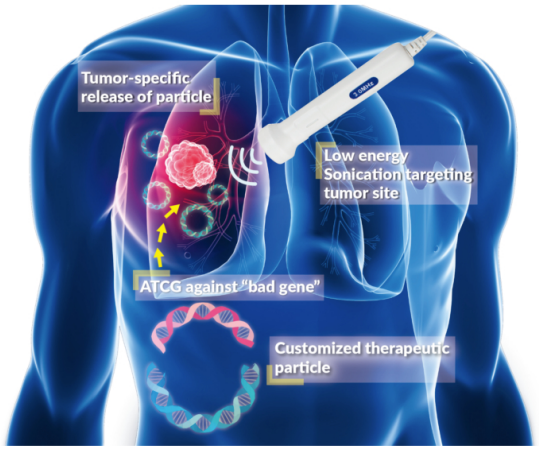
Therefore, CUHK team combined RNA interference technology and ultrasound microbubble system to form a novel virus-free gene therapy. The invention specifically delivers gene silencing particles into tumor without using any virus. It can serve as a rapid evaluating platform for therapeutic efficiency of new gene targets preclinically, as well as development to be a safe anticancer therapy clinically.

	Conventional method	Method in This Project
Safety	• Delivery by virus • Permanent change	• Virus-free • Reversible
Flexibility	• Genomic level • Cannot target post-transcriptional level	• mRNA level • Can design for any new gene isoforms
Precision	• Relatively low • Systemic diffuse • Affect all tissues	• High • Tissue-specific • Release in tumour

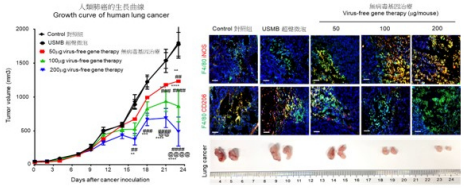




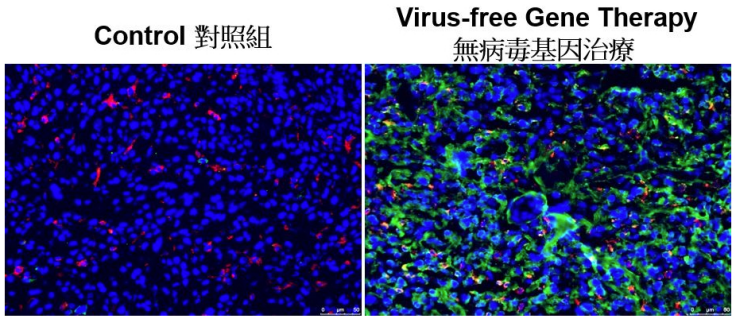
[Patrick MK Tang and HY Lan. Innovative Technology Fund 2019-2020 (Ref.: ITF/068/18)]



In our invention, the gene-silencing particles are specifically delivered to tumor by ultrasound microbubble system.



Our new method effectively stops the growth of human lung cancer by largely enhancing the anticancer immunity (iNOS+ F4/80) in tumor.



Our method (right), the gene-silencing plasmids (green) can be specifically delivered to tumor, avoiding off-target side effects of gene therapy.

CE's Reception for Awardees of International Exhibition of Inventions of Geneva 2021

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