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Success Story

Newly Discovered Strategy to Fight NPC

(Developed by Professor Tu Wenwei and his research team)

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SUCCESS STORY

Newly Discovered Strategy to Fight NPC

Treating Nasopharyngeal carcinoma (NPC) with a newly discovered combination of exosomes from $\gamma\delta$ -T ($\gamma\delta$ -T-Exos) cells with radiotherapy offers a powerful new strategy against the cancer



The research was led by Professor Tu Wenwei, Department of Paediatrics and Adolescent Medicine, School of Clinical Medicine, HKUMed (middle) and Dr Wang Xiwei, post-doctoral fellow of Professor Tu's team (left), is the first author. PhD student Zhang Yanmei (right) is a member of the research team.

Nasopharyngeal carcinoma, also known as NPC, is a cancer that attacks the upper part of the throat behind the nose. This cancer is one of the most aggressive Epstein-Barr virus (EBV)-associated tumours, which are widespread in East Asia, including Hong Kong. Sufferers often complain of symptoms including a persistent lump in the neck, pain or loss of hearing in the ear and a persistent blocked nose.

NPC is typically treated with radiation therapy in the first instance. However, this is not always successful as some patients are radio-resistant. NPC can sometimes be controlled by adoptive T cell-based immunotherapy, but this does not always succeed in effectively fighting the tumour.

A research team from the University of Hong Kong has now discovered that

combining exosomes originating from $\gamma\delta$ -T ($\gamma\delta$ -T-Exos) cells with radiotherapy can overcome both of these problems. The team found that $\gamma\delta$ -T-Exos can be used in combination with radiotherapy to control the cancer and limit the growth of the tumour.



Professor Tu Wenwei

clinical application of this approach.

" $\gamma\delta$ -T-Exos can effectively interact with and kill both EBV positive and negative NPC cells," said Professor Tu Wenwei of the Department of Paediatrics and Adolescent Medicine, School of Clinical Medicine at the University's LKS Faculty of Medicine, who led the research team. "More importantly, $\gamma\delta$ -T-Exos can eradicate radio-resistant NPC CSCs and preserve their tumour-killing and T cell-promoting activities in the immunosuppressive NPC microenvironment. Therefore, combination of radiotherapy with $\gamma\delta$ -T-Exos has great potential in the treatment of NPC, which will be highly beneficial to the clinical application of this approach."

The findings are a proof of concept for a new and powerful strategy to fight NPC.

The findings have been published in the *Journal for Immunotherapy of Cancer*.

The key advantages of the discovery are a novel immunotherapeutic approach against tumours, including solid tumours; a resultant off-the-shelf product with dual anti-tumour activities (direct killing and inducing T cell immunity); and a solution that is resistant to the acidic and immunosuppressive tumour microenvironment.

The Institute of Computational and Systems Biology Interdepartmental Program, University of California in the US also contributed to this research.

TTO assisted the team in filing patent applications for the inventions; holding discussions with the PI about commercialisation possibilities, including the launch of a start-up; inviting the team to take part in events to promote the invention, including the Asia Summit on Global Health and the TTO Tech Roadshow, and introducing investment and collaboration opportunities for commercialisation of the invention to the PI. Discussions with several prominent venture capitalists are still continuing.

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IP00933 Utilizing Monolayer Molecular Crystals to Improve Contact Properties of Organic Field-Effect Transistors | Dr CHAN Kwok Leung, USR 18/004,135 filed on 3 Jan 2023

IP00963 Spiro-cyclometalated iridium emitters for OLED applications | Prof. CHE, Chi Ming, EP 21857705.4 filed on 5 Jan 2023

IP01100 Method and device for high-throughput single-stream particle focusing | Prof. TSIA Kin Man, Kevin, USR 18/151,107 filed on 6 Jan 2023

IP01100 Method and device for high-throughput single-stream particle focusing | Prof. TSIA Kin Man, Kevin, CN filed on 6 Jan 2023

IP01278 A Composition-tunable Cold Atmosphere Chip for Multiplex Treatment on Cells | Prof. Anderson SHUM (ME), CN 202310018564.7 filed on 6 Jan 2023

IP00964 A non-immersive dry sintering strategy for realizing decent metal based top electrodes Prof. CHOY Chik Ho, USR 18/014,760 filed on 6 Jan 2023

IP01140 一種用於混凝土模塊建築的模塊間豎向連接及方法 | Prof. PAN Wei, CN 2023100268669 filed on 9 Jan 2023

IP01206 Monoclonal antibody neutralizing SARS-CoV-2 variants exhibits prophylactic and therapeutic effect in hamster | Prof. YUEN Kwok-Yung, CN filed on 11 Jan 2023

IP00817 Mesenchymal Stromal Cells as A Reprogramming Source for iPSC Induction | Prof CHAN Chi-Fung, Godfrey HK-CN 62022062654.8 filed on 25 Oct 2022

IP00953 The first generation of synthetic vaccine against Staphylococcus aureus infection | Prof. HUANG, Jian-Dong, EP-PCT 2180887.1 filed on 21 Dec 2022

IP00953 The first generation of synthetic vaccine against Staphylococcus aureus infection | Prof. HUANG, Jian-Dong CN-PCT filed on 16 Jan 2023

IP01300 Repurpose mRNA vaccines against infectious diseases as potent cancer therapeutic drugs | Prof. HUANG Jiandong (Biomedical Sciences) USP 63/439557 filed on 17 Jan 2023

IP01081 Iron-Catalyzed Highly Enantioselective cis-Dihydroxylation of Quinones with Aqueous H₂O₂ | Prof. CHE Chi-Ming PCT PCT/CN2023/072625 filed on 17 Jan 2023

IP01081 Iron-Catalyzed Highly Enantioselective cis-Dihydroxylation of Quinones with Aqueous H₂O₂ Prof. CHE Chi-Ming USR 18/155,431 filed on 17 Jan 2023

IP01247 A scalable method for achieving shape control of diamond micro- and nanoparticles | Dr. CHU Zhiqin (EEE), CN 202310062039.5 filed on 18 Jan 2023

IP01161 Heterologous influenza protection elicited by an intradermal influenza vaccine comprising a rationally designed single-round infectious virus | Dr. KOK Kin Hang, PCT PCT/CN2023/073098 filed on 19 Jan 2023

IP01150 Durable water and oil repellent plastics | Prof WANG Lijiu, CN 202310059878.1 filed on 19 Jan 2023

IP01150 Durable water and oil repellent plastics | Prof WANG Lijiu, USR 18/156,548 filed on 19 Jan 2023

IP01108 Dual targeting powder formulation for nasal and lung deposition through single intranasal administration | Dr LAM Ka Wing Jenny, PCT PCT/CN2023/073248 filed on 19 Jan 2023

IP00970 Reusable nanocomposite porous filter for highly efficient air filtration | TANG, Chuayang, PCT-CN(UM) filed on 19 Jan 2023

IP01274 Multi-scaled Aqueous Two-phase System (MsATPS) for Analyte Self-isolation | Prof. Anderson SHUM (ME), USP 63/440,144 filed on 20 Jan 2023

IP00923 Fluid-Driven Robotic Needle Positioner for MRI-guided Percutaneous Interventions | Dr KWOK Ka Wai, USR 18/017,090 filed on 20 Jan 2023

IP01168 Micro Scale Mist mouthguard cleaning device | Dr TSOI Kit Hon, USR 18/157,725 filed on 20 Jan 2023

IP00914 Genetically Encoded YEATS Domain Inhibitor | Dr LI Xiang David, US-PCT 18/006,977 filed on 26 Jan 2023

IP01259 DMA-incorporated resin matrix with enhanced mechanical and anti-bacterial properties | Prof. YIU Kar Yung Cynthia (Dentistry), USP 63/441,479 filed on 27 Jan 2023

IP01292 Paired-cell profiling systems for high-throughput screening syncytium formation | Prof. Anderson Shum (ME), USP 63/481,830 filed on 27 Jan 2023

IP01168 Micro Scale Mist mouthguard cleaning device | Dr TSOI Kit Hon, CN filed on 28 Jan 2023

IP01168 Micro Scale Mist mouthguard cleaning device | Dr TSOI Kit Hon, HKST 32023067524 filed on 28 Jan 2023

IP00914 Genetically Encoded YEATS Domain Inhibitor | Dr LI Xiang David, CN-PCT filed on 29 Jan 2023

IP01184 A Method of Derivation of Mesenchymal Stem Cells from Mammalian Pluripotent Stem Cells | Prof. Zhou Zhongjun, PCT PCT/CN2023/073818 filed on 30 Jan 2023

EVENT HIGHLIGHTS



Don't miss our Zoom webinar, MIT Insights: Filing Strong Patents on March 2, 9.30am-10.30am. Lita Nelsen, former director of the Technology Licensing Office at MIT, will explain the requirements for obtaining a patent and related topics. Read more here: https://hkuems1.hku.hk/hkuems/ec_hdetaill.aspx?guest=Y&ueid=86437



Our February 15 webinar, Patent 101: The Fundamentals and Tips for Inventors, featured information from US patent attorney Jennifer Che on how best to protect your invention. <https://www.tto.hku.hk/event/webinar-patent-101-the-fundamentals-and-tips-for-inventors-or-15-feb-4-00pm-hkt>



On January 18, our webinar with Dr Christopher Benson of HGF Limited offered advice on how to protect AI-based inventions. <https://www.tto.hku.hk/event/webinar-protection-for-inventions-using-ai-or-18-jan-4-30pm-hkt>

PROGRESS UPDATES

The Legal Team had 128 new cases in hand in January, up more than 50% on the 81 new cases in January 2022.

The IPM Team received 16 IDFs in January, up from 12 in 2022. They also filed 37 applications, up from 18 last year.

The BD Team had 108 cases in January 2023, up from 93 in the same month last year. These included 38 entrepreneurship and start-up company cases, an increase of more than six-fold on the 6 cases handled in 2022.

TECHNOLOGY COMMERCIALISATION

List of technologies Licensed in December 2022 and January 2023

Title	IP Types	PI	Faculty
A Method and Reagents to Chemically Label and Modify Peptides and Proteins	CN Patent No. ZL201510236410.0 US Patent No. 9,752,137	Prof. Xuechen Li	Science
Humanized Monoclonal Antibody for Inhibiting Progression of Hepatocellular Carcinoma	PCT Application No. PCT/CN2022/132000	Prof. Zhiwei Chen	Medicine

Top 3 revenue-booked IP in December 2022 and January 2023

Title	IP Types	PI	Faculty
Humanized Monoclonal Antibody for Inhibiting Progression of Hepatocellular Carcinoma	PCT Application No. PCT/CN2022/132000	Prof. Zhiwei Chen	Medicine
New Antibacterial Cyclic Lipopeptides	PRC Patent No. ZL201780035657.3 US Application No. 16/310,364	Prof. Xuechen Li	Science
E-form	Copyright	Versitech	Engineering

TRANSFERRING YOUR NEW TECHNOLOGIES INTO BUSINESS OPPORTUNITIES

POLICY STIPULATION

The latest policy stipulates that the net receipts arising from the exploitation of an Invention are shared among the University, the relevant faculty/department and the inventor(s) in the ratio of 1/3 : 1/3 : 1/3. It aims to encourage the researchers at HKU not only to excel in academic performance but also to apply their technology for the benefits of mankind with an impressive reward.

HOW TO APPLY: 4 PHASES FOR RESEARCH PROJECTS

Phase 1: Initial project negotiation

1. PI will negotiate with their collaborator(s) and confirm a project proposal which includes the scope, budget and duration of the project.
2. PI will negotiate with their collaborator(s) and prepare a draft agreement (Agreement templates are available at the website of the Research Services (RS): <http://www.rss.hku.hk/contracts/contractresearch/templates>).

Phase 2: Endorsement from department/faculty

3. PI will submit the project proposal, the draft agreement, and the information form/grant application form to their department/faculty to seek an approval (The information form for research/consultancy agreements is available at: <http://intraweb.hku.hk/local/rss/tto/researchor-consultancy-agreements-form.doc>).
4. After obtaining the approval, PI will

submit the project proposal, the draft agreement, and the information form/grant application form to the Research Service (RS).

Phase 3: Financial legal/IP review

5. The RS will distribute the project proposal and the draft agreement to the Finance and Enterprises Office (FEO) for financial review and to the Technology Transfer Office (TTO) for legal review.
6. If there is any financial/legal issue, the FEO/TTO will inform PI through the RS. PI will negotiate with their collaborator(s) on the financial/legal issue until it is settled.

Phase 4: Signature and document archiving

7. After consolidating the settled project proposal and the agreement, the RS will proceed to the signature process.
8. After duly performing the signature process, the RS will assign the RCGAS number(s) for opening the project account(s)

ABOUT US

About HKUTTO

The Technology Transfer Office (TTO) is committed to maximising the impact of research through technology transfer at both the institutional and industrial levels. TTO works closely with researchers at HKU to commercialise their inventions through professional consultation on business development, legal advice and assistance, as well as patent application filings. Your inventions will not benefit society unless they are mass produced.

About Versitech

Versitech Limited is the commercial arm of HKU. Versitech negotiates, executes and manages commercial business contracts and agreements on behalf of the University.

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