



A first-in-class drug

for the treatment of

Atopic Dermatitis (Eczema)

Developed by Antenovus Biotechnology Limited, an HKU spinoff company

Unmet Medical Need

An Unmet Medical Need for Close to 800 Million People with Atopic Dermatitis
Documented Surge of New On-set of Atopic Dermatitis after COVID-19 Pandemic



The Main Culprits

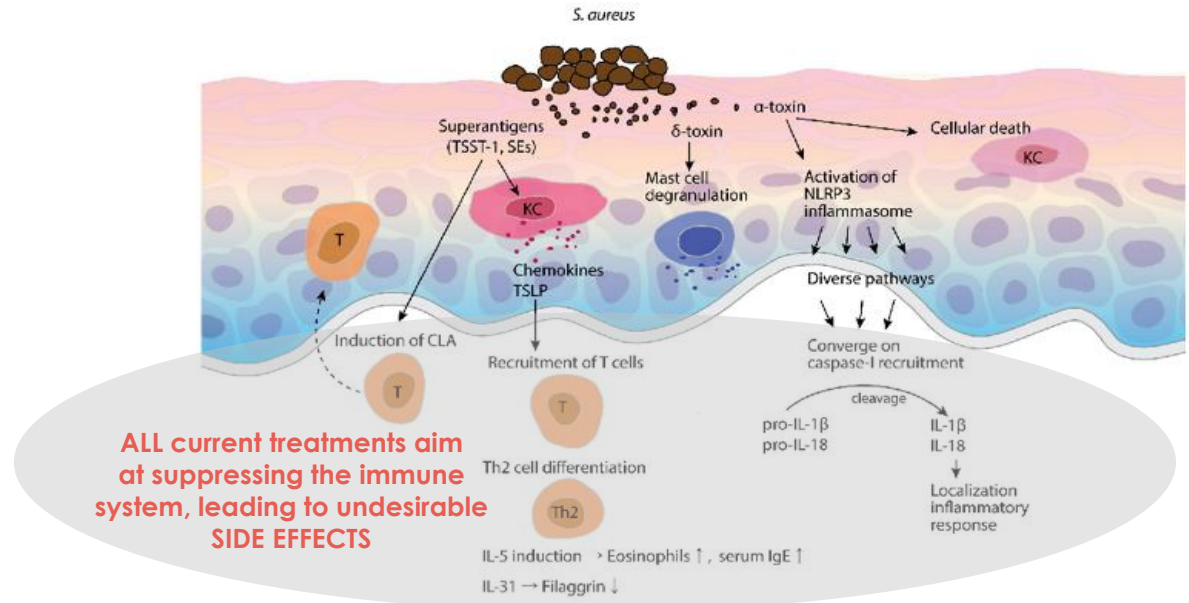


More than **30 %** healthy people
are colonized with ***S. aureus***



Close to **100 %** Atopic Dermatitis patients
are colonized with ***S. aureus***

The toxins and virulence factors of *S. aureus* are the culprits of atopic dermatitis



Anti-virulence Drugs

Drugs Suppressing the Toxicity of *S. aureus* to Eliminate the
ROOT CAUSE of Inflammation & Itchiness



High
Virulence



Non-antibiotic, non-steroidal, non-immunosuppressant anti-virulence
drugs treating the root cause of atopic dermatitis

Groundbreaking & Disruptive!

Low
Virulence



ABL-1

Our First-in-class Anti-virulence Drug for Atopic Dermatitis

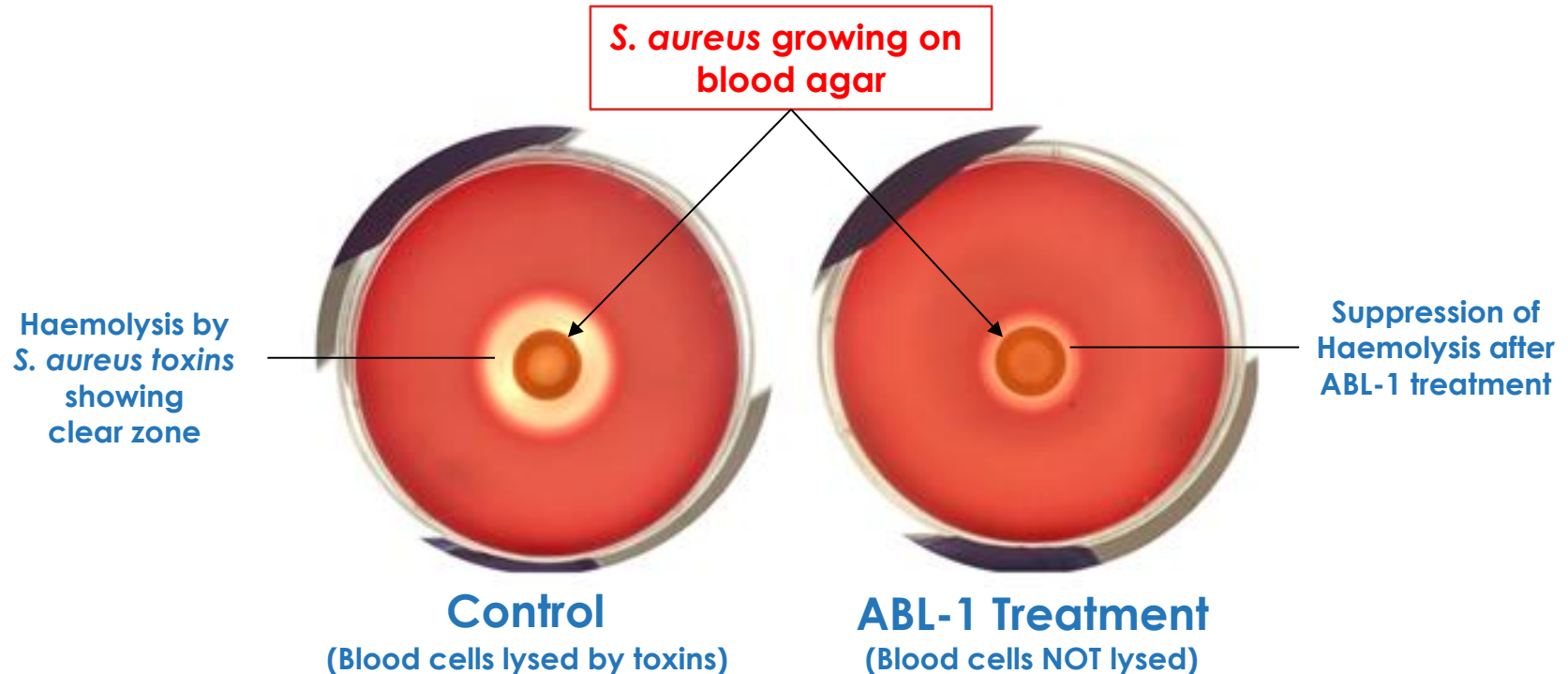
Lead Project	Drug Class	Route of Administration	Indication	Mechanism of action
ABL-1	Small Molecule	Topical (Cream / Ointment)	Atopic Dermatitis	Anti-virulence (Suppression of toxin and virulence production in <i>S. aureus</i> including MRSA)

Development Status of ABL-1 for Atopic Dermatitis

Year	2019	2025	2026 (Q4)	2028	2029/30	2031	2032
Candidate	Lead Compound Selection & Optimization	Preparation for Investigational New Drug (IND)-enabling Studies	(IND)-enabling Studies commenced	Phase 1/2 Clinical Trials	Phase 3 Clinical Trial	New Drug Application (NDA) Submission	NDA Approval and Product Launch
ABL-1							

Preclinical

ABL-1 Suppresses Toxin and Virulence Production in *S. aureus*



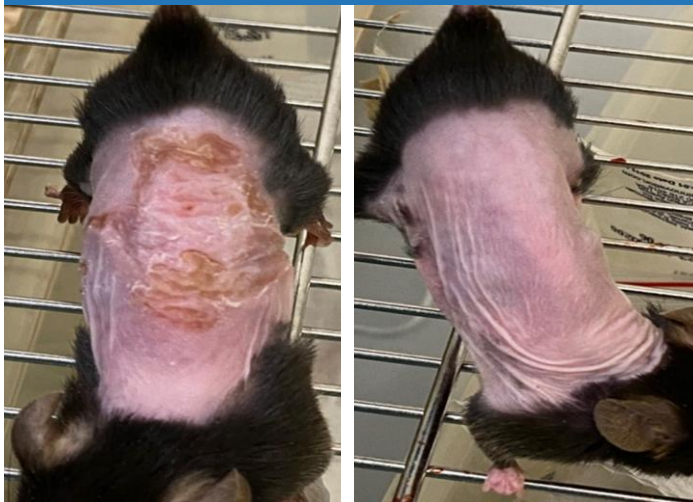
Preclinical

Animal Tests

*ABL-1 Treats Atopic Dermatitis and
Reduces Plasma IgE Elevation in mice model*

ABL-1

Treats atopic dermatitis in mice
(daily topical dosing for 7 days)

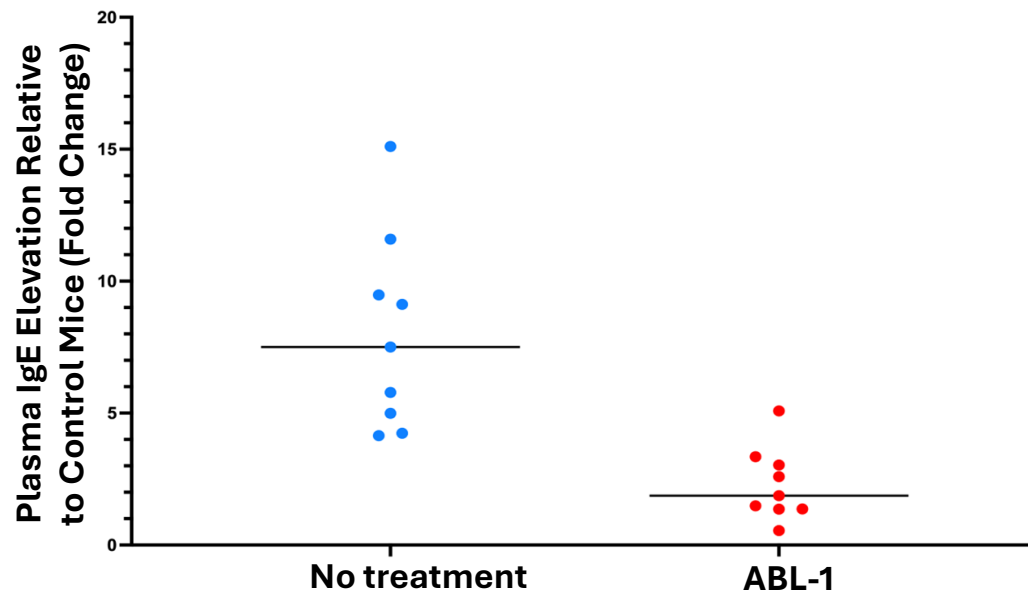


No treatment

ABL-1 treatment

ABL-1

Reduces Plasma IgE Elevation



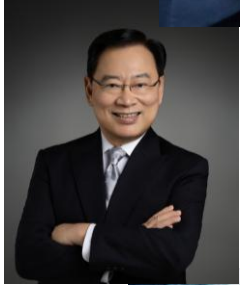
Leadership Team



Dr. Richard Kao

Founder / Director / Chief Executive Officer

- BSc (Hons), Ph.D. (UBC, Canada), Postdoc (Harvard Medical School, USA)
- Associate Professor, Department of Microbiology, LKS Faculty of Medicine, HKU
- The 2023 Horizon Prize, The Royal Society of Chemistry
- The 2019 State Scientific and Technological Progress Award
- The 2017 1st Hubert Tuor Prize – ICPI Innovation Academy Award at Geneva, Switzerland



Herman Lau

Chairman Of The Board

- Graduate & Honorary University Fellow from HKBU
- Founder of Daiwa Associate Holdings since 1980 & public listed in 1994
- Pioneer entrepreneur bring in JVs to China from Japan, USA and Europe since early 80's
- Leading Distributor of IC Chips, manufacturer of 5G telecom modules & elect components
- On-line, off-line & marketing to mass merchants of digital products in Canda and America



Dr. Thomas Lee

Chief Operating Officer

- B.Pharm (Hons) (CUHK), Ph.D. (U of Wisconsin-Madison, USA), Registered Pharmacist
- Over 25 years of experience in Pharmaceutical Development including >10 years in Bristol-Myers Squibb, Novartis and Celgene in the USA
- Developed 4 commercial drug products and 1 dietary supplement
- Advanced 9 preclinical programs to clinical trials in US and Canada



Jason Madar

Chief Data Officer

- BSc (Hons), MSc (UBC, Canada)
- Software development leader with 25+ years in database development and data mining
- Co-founder & CTO of Vandrico Solutions, Snakebye Digitec & HealthQB Technologies Inc.



Advisors



Prof. Kwok Yung YUEN
HKU, Academician, CAE.
Awardee of Future
Science, Clinical Advisor



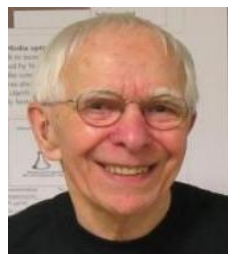
Prof. Kelvin TO
HKU
Clinical Advisor
(Microbiology)



Prof. Ivan HUNG
HKU
Clinical Advisor
(Medicine)



Prof. Yumi MATSUOKA
Osaka U
Clinical Advisor
(Dermatology)



Prof. Julian DAVIES
UBC, Scientific Advisor
(In memory of Prof. Julian Davies,
a towering figure in microbiology
and biotechnology, for his
untimely passing in Feb, 2025)



Prof. Jiangnan SHEN
HKU
Scientific Advisor
(TCM)



Prof. Pauline CHIU
HKU
Scientific Advisor
(Medicinal
Chemistry)



Dr. Robin WALKER
Regulatory
Affairs Advisor
(Toxicology)



Dr. Kwok CHOW
Regulatory Affairs
Advisor (Chemistry,
Mfg. & Control)



Dr. Mary MAZUR-MELNK
Regulatory
Affairs Advisor
(Quality Assurance)



CAGR 9.07%
2024 - 2030

2030 TAM

\$29.9B

\$17.6B

2024 TAM

Market Size



> 780 MILLION*
AD Patient Population

**Clinical and Experimental Dermatology, Volume 50, Issue 10, October 2025, Pages 2054–2056*

TAM = Total Accessible Market

ALL Existing Competitive Products Temper with Immune System

Drugs	Topical ABL-1 (Antenovus)	Therapeutic Antibodies	Oral Immuno- suppressants	Topical Opzelura® (Incyte)	Topical Eucrisa® (Pfizer)	Topical Tacrolimus (Generic)	Topical Pimecrolimus (Generic)	Topical Steroids (Generic)
Mechanism of Action	<u>Anti-virulence</u> non-immunosuppressant	Antibodies; immunosuppressant	Immunosuppressant	JAK Inhibitor; immunosuppressant	PDE-4 Inhibitor; immunosuppressant	Calcineurin Inhibitors; immunosuppressant	Calcineurin Inhibitors; immunosuppressant	Corticosteroids; immunosuppressant
Stage of Disease	Mild to severe	Moderate to severe	Mod to severe	Mild to moderate	Mild to moderate	Moderate to severe	Mild to moderate	Mild to severe
Combination with Immunosuppressants	Yes	No	No	No	No	No	No	Not recommended
Use in Open Wound /Infections	Yes	N/A		No	No	No	No	No
Efficacy	Complete clearance of AD in a week in animal models	40% (Drug) Vs 10% (Placebo)	Controversial	50% (Drug) Vs 15% (Vehicle)	30% (Drug) Vs 20% (Vehicle)	35% (Drug) Vs 10% (Vehicle)	35% (Drug) Vs 20% (Vehicle)	Generally satisfactory
Time to Show Improvement	1 week	Up to 16 weeks		8 weeks	4 weeks	2 weeks	2 weeks	Up to a week
Safety Profiles	Safe	Mild adverse events	Severe immune- related side- effects: blood/ liver tests needed	Acceptable; <20% body surface area and up to 1 tube (60g)/week	Site pain in > 1% of patients	Skin burning ; Pruritus; Flu-like symptoms.	Burning, headache, fever, infections, etc.	Major side- effects related to steroids
Black Box Warning	N/A	N/A	N/A	Infections/Cardio- vascular events/Mortality/ Malignancy	N/A	Infections/Malignancy		N/A
Annual Cost (USD)	To be disclosed	\$10,609	\$7,792	\$1,343		\$140		\$46
Market Share	To be disclosed	15.9%		1.2%		32.2%		66.7%

Value Realization

M&A: Recent M&A Deals in Atopic Dermatitis

Product	Generic Name	Mechanism of Action	Year	Acquiring Company	Acquired Company	Stage of Development	Deal Size (USD)
PX-128	N/A	Antibody	2024	J & J	Proteologix	Phase 1	850M
NM-26	N/A	Antibody	2024	J & J	Numab	Phase 2 Ready	1.25B
KHK4083	N/A	Antibody	2021	Amgen	Kyowa Kirin	Phase 3 Ready	1.25B
Eucrisa®	Crisaborole	PDE-4 Inhibitor	2016	Pfizer	Anacor Pharma	Phase 3	5.2B
Elidel®	Pimecrolimus	Calcineurin Inhibitors	2011	Meda	Novartis	Commercialized	420M

KEY PLAYERS

Company	Existing Atopic Dermatitis Products
	Eucrisa® Ointment
	Opzelura® Cream
	Ebglyss® Ab
	Adbry® Ab Protopic® Ointment
	Dupixent® Ab
	A Phase 3 Ab
	One Phase 1 and One Phase 2 Ab

Valuation and IPO Schedule

Year	2025	2027/2028	2029/2030
Stage of Development	Preclinical	Phase 1/2 Clinical Trials	Phase 3 Clinical Trial
Valuation* (USD) *Valuation by TR Capital & Partners	50M	698M	2,597M → IPO

Investment Opportunity

Seed Round (2026): Raise **5M** USD

Year	Stage	Valuation* (USD)	Multiples**
2023 (pre-seed round)	Pre-clinical	\$25M	-
2026	Pre-clinical New Drug (IND)- enabling Studies	\$50M	-
2028	Phase 1/2 Clinical Trials	\$698M	14x
2029/2030 (IPO)	Phase 3 Clinical Trial (Multi-centre)	\$2,597M	52x

*Valuation by TR Capital & Partners

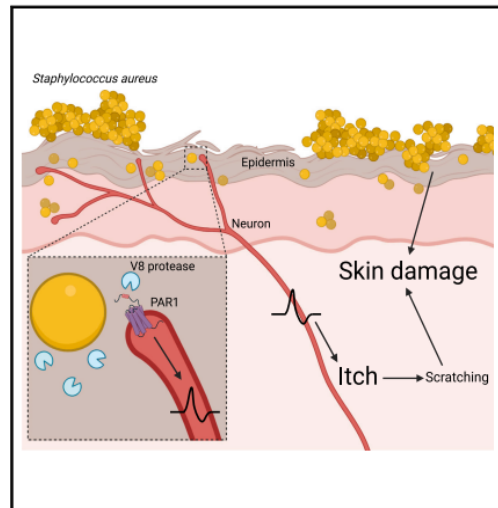
**Multiples are estimated based on a valuation of 50M

Roadmap & Use of Proceeds of the Seed Round

[illegible]

***S. aureus* drives itch and scratch-induced skin damage through a V8 protease-PAR1 axis**

Graphical abstract



Authors

Liwen Deng, Flavia Costa, Kimbria J. Blake, ..., Rithwik Ramachandran, Alexander R. Horswill, Isaac M. Chiu

Correspondence

isaac_chiu@hms.harvard.edu

In brief

Itch evokes a desire to scratch, but the link between microbes and itch was unclear. *Staphylococcus aureus*, a bacterial pathogen, secretes a protease V8 that activates PAR1 expressed on neurons to drive itch and skin damage.

Highlights

- *S. aureus* induces itch and scratch damage with epicutaneous skin exposure
- V8 protease (SspA) is necessary and sufficient for itch during *S. aureus* exposure
- *S. aureus* V8 activates mouse and human sensory neurons through PAR1
- PAR1 deficiency or blockade abrogates *S. aureus*-induced itch and skin damage

News | Article | February 23, 2024

Atopic Dermatitis Itch May Be Caused by Microbes, Not Inflammation

Author(s): Susan C. Olmstead, Editor

Researchers have found *Staphylococcus aureus* may trigger itchiness in atopic dermatitis, opening the door to new treatment approaches in the future.

New [research](#) published in *Cell* suggests that the itching experienced by patients with atopic dermatitis may not be due to inflammation, as is commonly assumed, but instead to the bacterium *Staphylococcus aureus* and its effects on nerve cells.¹

The study authors claim their findings regarding the role of microbes in itch generation are novel and could change how itch is treated clinically.

"We've identified an entirely novel mechanism behind itch—the bacterium *S. aureus*, which is found on almost every patient with the chronic condition atopic dermatitis. We show that itch can be caused by the microbe itself," said senior author Isaac Chiu, associate professor of immunology in the Blavatnik Institute at Harvard Medical School, in a Harvard news release.²

Chiu et al used a mouse model to test various bacteria and found that *S. aureus* caused itch that intensified over several days and led to an [itch-scratch cycle](#), skin damage, and alopecia, a hypersensitive response to gentle stimuli.

"It's a speculation at this point, but the itch-scratch cycle could benefit the microbes and enable their spread to distant body sites and to uninfected hosts," said study author Liwen Deng in the news release.

Mast cells and basophils did not drive itch after bacterial exposure, the study showed.



New Africa/AdobeStock

The Founder of Antenovus Biotechnology Professor Richard Kao has been well recognized for his 20+ years devoted research in drug discovery

2003:

- Working with world's top scientist Dr. David Ho (何大一) to combat SARS epidemics with peptide-based fusion inhibitors.



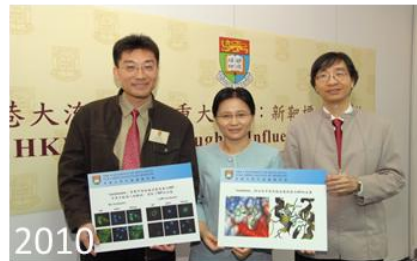
2004:

- Featured in Time Magazine for Kao's discovery of new inhibitors of SARS coronavirus.
- Kao's research work in combating SARS was recognized by the world and praised by China's Premier Mr. WEN Jiabao.



2010:

- Nature Biotechnology published Kao's study on the identification of world's first viral nucleoprotein inhibitor nucleozin for treatment of influenza virus infection.



Featured in Time Magazine , 2004

Breaking the SARS Code

Using a novel research technique, Hong Kong scientists find new ways to attack a deadly disease

By BRIAN WALSH HONG KONG

THE FRIGHTENING RESPIRATORY disease SARS, which paralyzed much of Asia in the spring of 2003, has since faded from the headlines, obscured by rising new threats like avian influenza. But scientists know that SARS is not gone for good, and research efforts to unlock the secrets of the virus that left almost 800 dead continue. At the University of Hong Kong (HKU), where the SARS coronavirus was first identified in March 2003, researchers last week announced the results of a landmark study that could point the way toward potential anti-SARS drugs and provide a potent research tool to quickly analyze new viruses. "This is a technique that is not only applicable to SARS but also to every emerging disease," says Professor K.Y. Yuen, head of microbiology at HKU. The study involved the first-ever use on an infectious disease of a new research technique called chemical genetics. Every virus presents scientists with a new kind of genetic code—the challenge is to figure out how to decipher it to gain a fuller understanding of how the virus works and how to combat it. In the past, such research was often slow and laborious. But thanks to chemical genetics—which allows scientists to quickly test how a new virus reacts with thousands of different chemicals—viruses that might have remained indecipherable for years can now be at least partially unlocked in months or even weeks. "Instead of testing out keys a lock one by one, it's like trying out 50,000 keys all at once," says Yuen.

The point of both chemical and classical genetic research is to figure out which genes do what—in effect, to learn to read an organism's genetic language. In classical genetics, scientists usually mutate an organism, see how its functions have changed (a mutated virus might no longer be infectious) and then work back and identify which gene mutated. If a mutated virus loses its ability to infect a cell, then that gene

probably has something to do with infectivity. In chemical genetics, explains Dr. Richard Kao, the lead researcher on the HKU study, scientists try to do the same by testing thousands upon thousands of chemicals on virus samples. The vast majority won't have any effect, but a handful will. Researchers can then take those virus samples and use further tests to figure out which viral gene has been affected by



which chemical. "If we discover that interfering with a certain gene stops the virus from replicating, then we know that gene's function likely has to do with replication," says Kao, a biochemist who brought his passion for chemical genetics to HKU from Harvard University, where the process was first pioneered in the early 1990s. In HKU's SARS study, Kao and his colleagues filled the tiny wells of a small, waffle-like board with samples of the coronavirus cultured in cell lines. Micro-

scopic amounts of different chemical compounds were introduced into each separate well using a \$180,000 machine called an automated high-throughput screening platform. Once the chemicals had time to interact with the virus, scientists could examine the results with an inverted microscope. The process was repeated until all 50,240 compounds in their chemical library had been tested, which took a few months. "You'd think it'd be tedious work, but it's really not that bad," says Kao. If the chemical failed to interfere with the virus, as was the case with most of them, researchers would easily see evidence of unchecked infection in the cell lines. But about 1,000 compounds seemed to slow the virus, and 104 of those all but stopped infection. It stood to reason that those compounds were hitting the viral genetic pathways that were most important for infectivity.

With help from their collaborators at the Aaron Diamond AIDS Research Center in New York, Kao and his colleagues discovered that one of 104 compounds inhibited a kind of viral processing inside the cell, six inhibited viral replication and 18 seemed to prevent the virus from entering the cell in the first place. (Kao says further work will be needed to figure out which viral genes the remaining 78 compounds affect. One of them seems to affect both processing and replication.) A number of these compounds could form the basis for promising anti-SARS drugs, and HKU plans to begin animal-testing some of the most effective compounds soon. But the real value of the study is the clearer picture it offers of the SARS virus and the blueprint it provides for research responses to any future emerging diseases, like avian flu. "We can react more rapidly, and we can find new drugs that specifically target the disease," Kao says. "If there's a new virus, we can jump onto this."

Around HKU, that's a question of when, not if. HKU's work on SARS and bird flu has helped transform a regional university into a world player in disease research, and its staff understand that they are part of a vital bulwark. "Hong Kong is a very strategic place to be for emerging infectious-disease work," says Yuen. And when the next would-be superbug pops up, at least scientists will have one more arrow in their quiver.

The Founder of Antenovus Biotechnology Professor Richard Kao has been well recognized for his 20+ years devoted research in drug discovery

2017:

- Discovery of a potent inhibitor of MRSA pigment production leading to the proposed treatment option using a new non-antibiotic compound NP16 to treat MRSA infections.
- Professor Kao received the Innovation Academy Award from International Consortium of Prevention and Control of Infection (ICPIC) in Geneva, Switzerland.



2018:

- Discovery of a new potent inhibitor of MRSA virulence expression leading to the proposed treatment option using a new non-antibiotic compound M21 to treat MRSA infections.

2019:

- Founding of Antenovus Biotechnology Limited focusing on utilizing university-derived innovative technologies to provide non-antibiotic solutions for treating infection related diseases. Awardee of the State Scientific and Technological Progress Award.

2023:

- The Royal Society of Chemistry 2023 Dalton Horizon Prize for pioneering research on the treatment of COVID-19.



Enquiry



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