安 腾 诺 华 生 物 科 技 有 限 公 司 研 发

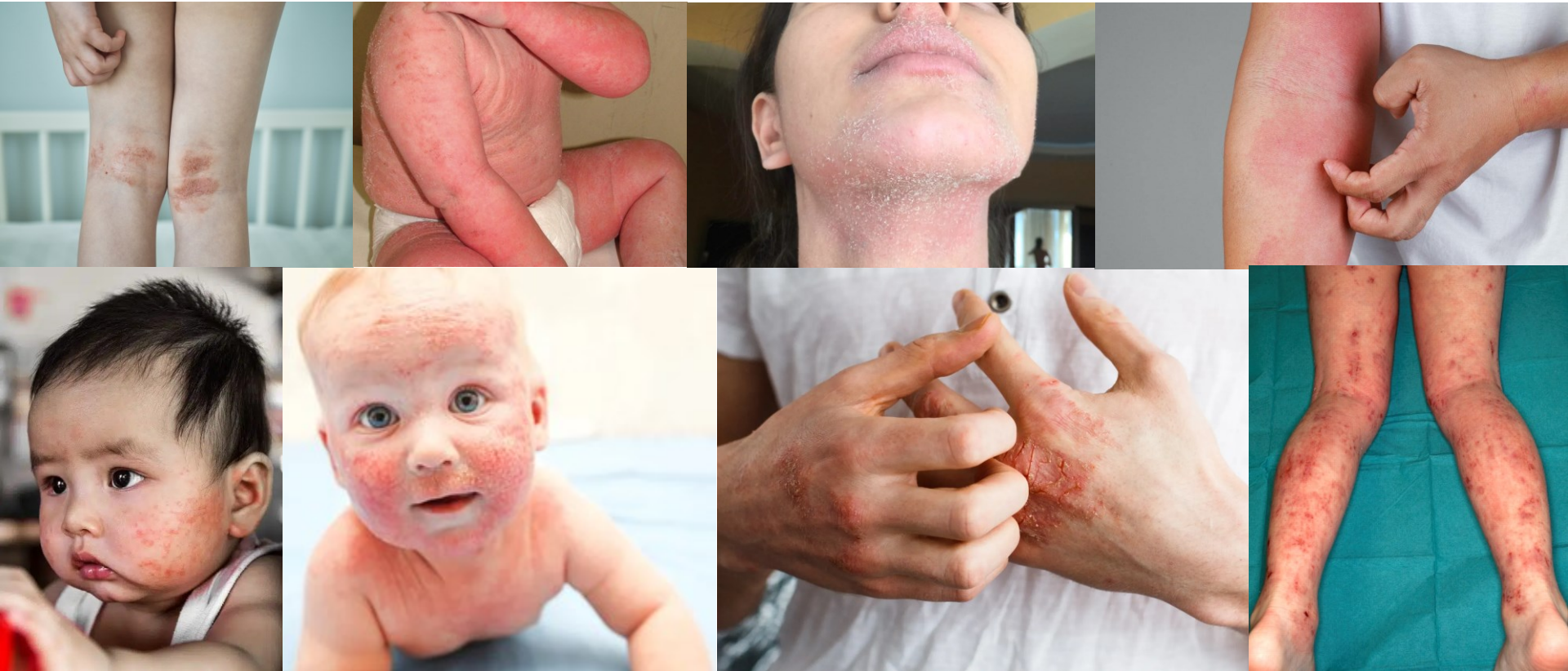
可从根源层面治疗

特应性皮肤炎 (湿疹)

的首创药物

当前未满足的医疗需求

超过 7.8 亿特应性皮肤炎患者的医疗需求并未被满足



主要元凶

高达 **30 %**

健康人定植有**金黄色葡萄球菌**

高达 **100 %**

特应性皮肤炎病人定植有**金黄色葡萄球菌**

金黄色葡萄球菌的毒素和毒力因子是导致特应性皮肤炎的罪魁祸首

金黄色葡萄球菌

↓

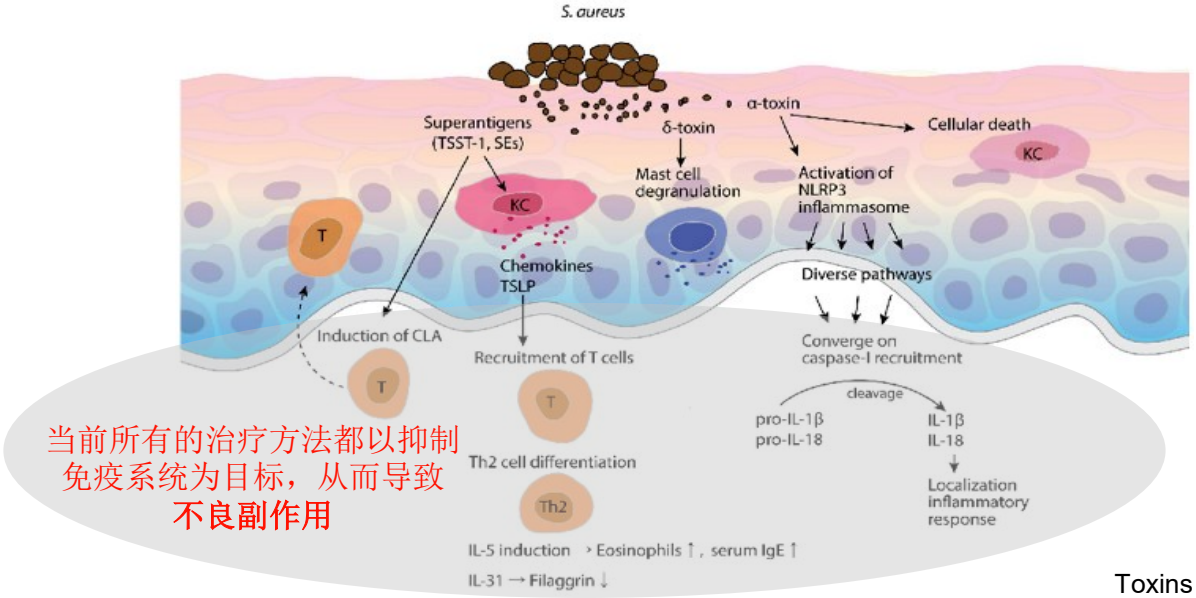
毒素和毒力因子

↓

炎症
瘙痒/发红

↓

特应性皮炎

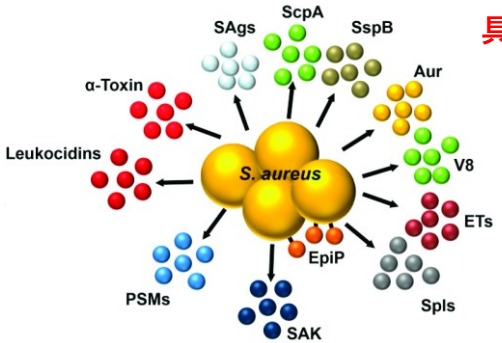


当前所有的治疗方法都以抑制免疫系统为目标，从而导致**不良副作用**

Toxins 2017, 9 (1)

抗毒力药物

药物通过抑制金黄色葡萄球菌的毒力，可从根源控制炎症及搔痒



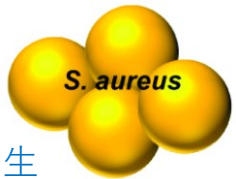
具毒力的金黄色葡萄球菌

毒素及毒力因子的产生
发炎及搔痒

抗毒力
药物

无害的金黄色葡萄球菌

X



抑制毒素及毒力产生
无发炎或搔痒

高毒力

非抗生素非类固醇和非免疫抑制剂的抗毒力药物
主要针对特应性皮炎的诱发因素

开创性和颠覆性

低毒力

ABL-1

我们具有首创性治疗特应性皮肤炎的抗毒力药物

主导项目	药品类别	给药途径	适应症	作用机制
ABL-1	小分子化合物	外用(霜/软膏)	特应性皮肤炎	抗毒力（抑制金黄色葡萄球菌产生毒素，包括 MRSA）

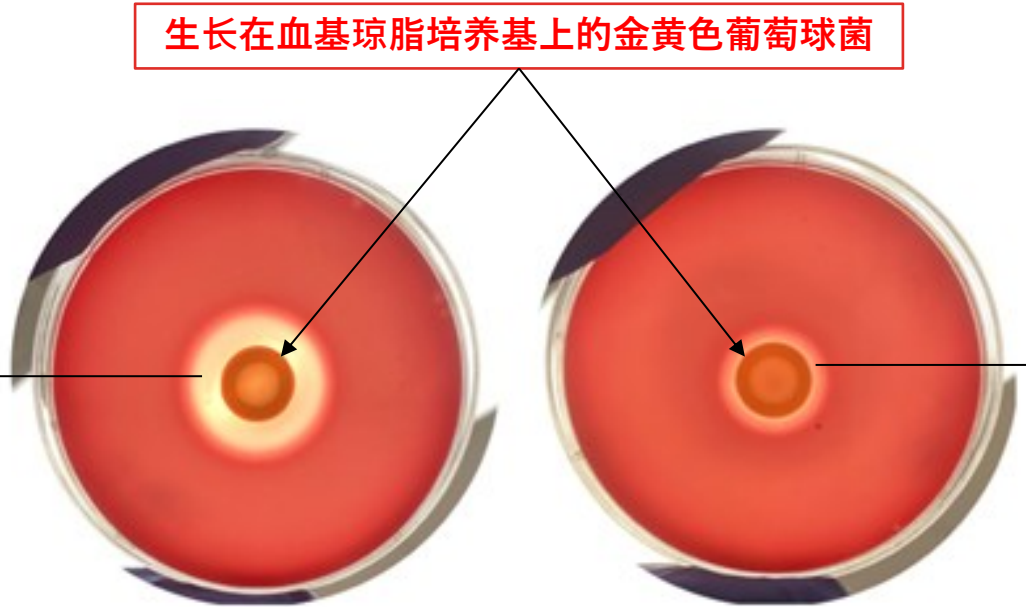
用于治疗特应性皮肤炎的药物ABL-1的开发现状

	2019年	2025年	2026年	2026年	2029年	2030年	2031
候选药	先导药物优化	为新药临床试验 (IND) 支持性研究做准备	IND 支持性研究	一期及二期临床试验	三期临床试验	提交新药申请	新药获得批准并进行产品发布
ABL-1							

临床前

体外数据

ABL-1 可抑制金黄色葡萄球菌的毒素和毒力产生



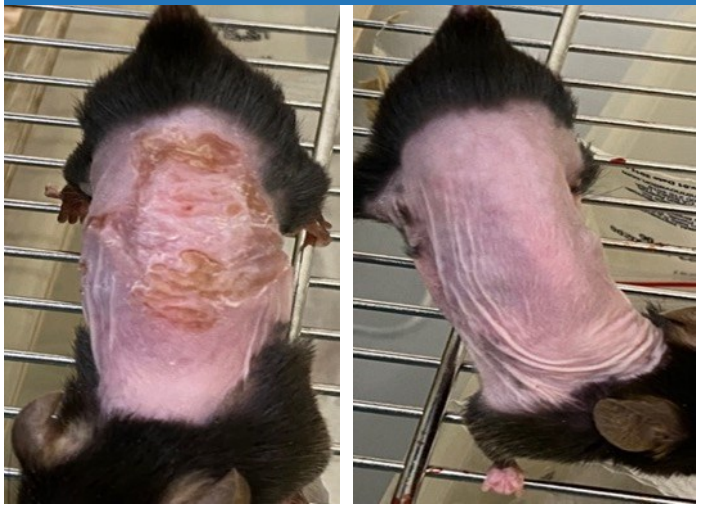
临床前

动物测试

ABL-1可治疗特应性皮炎及感染性伤口

ABL-1

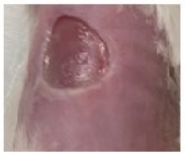
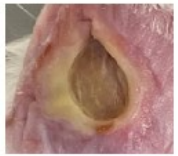
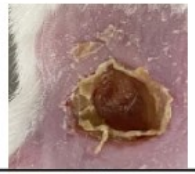
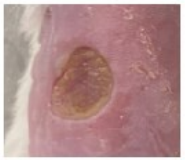
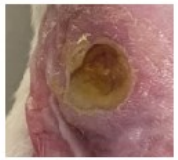
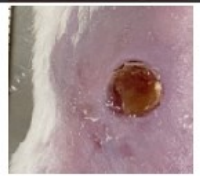
治疗小鼠特应性皮肤炎（每日局部给药，持续7 天）



不治疗　　ABL-1治疗

ABL-1

加速小鼠伤口愈合

	首天	第 4 天	第 8 天
不治疗			
ABL-1治疗			

领导团队

高一村博士

创办人 / 董事 / 首席执行官

- 理学士（荣誉）、博士（加拿大英属哥伦比亚大学），博士后（美国哈佛）
- 香港大学李嘉诚医学院微生物学系副教授
- 英国皇家化学会 2023 年Horizon奖
- 2019年度国家科学技术进步奖
- 2017年 Hubert Tuor 瑞士日内瓦 ICPIC 创新学院奖第一名

刘得还先生

董事长 / 首席财务官

- 毕业于香港浸会大学及为浸会大学荣誉院士
- 1980创立台和商事控股有限公司及于1994年在香港联交所上市
- 香港先锋企业家，于八十年代开始为中国引进日、美、欧合资企业
- 各国集成电路 (IC) 代理；生产5G通讯模块、电子元器件和计算机产品
- 在美加的数码产品线上、线下和对超级商场的销售

李伟业博士

首席运营官

- 药学学士（荣誉，香港中文大学），博士（美国威斯康辛大学麦迪逊分校），注册药剂师
- 超过 25 年药物开发经验，包括：
  1. 在美国 Bristol-Myers Squibb、Novartis 和 Celgene 工作过10 年
  2. 开发了4种商业药品和1种膳食补充剂
  3. 参与了9个为进入美国和加拿大临床试验的临床前项目

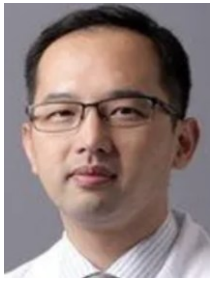
马振声先生

首席数据官

- 理学士（荣誉），理学硕士 （加拿大英属哥伦比亚大学）
- 软件开发领导者，拥有 25 年以上数据库开发与数据探勘经验
- 于Vandrico Solutions Snakebye Digitec & HealthQB Technologies Inc. 任共同创办人及首席技术官

顾问

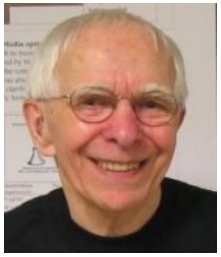
香港大学袁国勇教授
中国工程院院士与
未来科学奖得主
临床顾问



香港大学杜启泓教授
临床顾问
微生物学领域

香港大学孔繁毅教授
临床顾问
医学领域

大阪大学松冈柔美教授
临床顾问
皮肤科领域



Prof. Julian DAVIES
英属哥伦比亚大学
科学顾问
（纪念微生物学与生物技术领域的泰斗Julian Davies教授——2025年2月不幸逝世）

沈剑刚教授
香港大学
科学顾问
传统中医领域

赵宝贻教授
香港大学
科学顾问
药物化学领域

Dr. Robin WALKER
监管事务顾问
（毒理学）

周国裔博士
监管事务顾问
（化学，
制造和控制）

Dr. Mary MAZUR-MELNK
监管事务顾问
（质量保证）

市场规模

复合年增长率
GAGR 9.07%
2024 - 2030

2030 TAM

$ 299亿

$ 176亿

2024 TAM

> 7.8 亿
特应性皮肤炎患者群体

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

TAM =整体潜在市场

竞争者产品均会影响免疫系统

药品	外用 ABL-1 （安腾诺华）	治疗性抗体	口服免疫抑制剂	外用Opzelura ® (Incyte)	外用Eucrisa® （辉瑞）	外用他克莫司 （非专利）	外用吡美莫司 （非专利）	外用类固醇 （非专利）
作用机制	抗毒力 非免疫抑制剂	抗体: 免疫抑制剂	免疫抑制剂	JAK抑制剂； 免疫抑制剂	PDE-4抑制剂； 免疫抑制剂	钙调磷酸酶抑制剂；免疫抑制剂	钙调磷酸酶抑制剂； 免疫抑制剂	皮质类固醇； 免疫抑制剂
病情阶段	轻度至严重	从中度到严重	从中度到严重	轻度至中度	轻度至中度	从中度到严重	轻度至中度	轻度至重度
与免疫抑制剂联用	可以	不可以	不可以	不可以	不可以	不可以	不可以	不推荐
用于开放性伤口/感染	可以	不适用		不能	不能	不能	不能	不能
功效	动物模型: 一周内完全清除	40%（药物）与 10%（安慰剂）	有争议的	50%（药物）与 15%（安慰剂）	30%（药物）与 20%（安慰剂）	35%（药物）与 10%（安慰剂）	35%（药物）与 20%（安慰剂）	整体满意
起效时间	一周	长达 16 周		8周	4周	2周	2周	最长可达一周
安全概况	安全	轻微副作用	会有与免疫相关的严重副作用：需要进行血液和肝功能检查	可以接受； <20% 体表面积，每周最多 1 管（60 克）	> 1% 的患者出现局部疼痛	皮肤灼烧感；搔痒：类似流感的症状。	灼烧感、头痛、发烧、感染等。	与类固醇相关的主要副作用
黑盒子警告	不适用	不适用	不适用	感染/死亡率/ 恶性肿瘤， 心血管事件	不适用	感染/恶性肿瘤		不适用
病人年度费用	建议病人年度费用：待透露	10,609 美元	7,792 美元	1,343 美元		140 美元		46 美元
市场占有率	待透露	15.9%		1.2%		32.2%		66.7%

价值实现

并购：特应性皮肤炎药物近期并购交易

产品	通用名	MOA	年	收购公司	被收购公司	发展阶段	交易规模（美元）
PX-128	不适用	抗体	2024	強生	Proteologix	第一期临床	8.5亿
NM-26	不适用	抗体	2024	強生	Numab	第二期临床准备就绪	12.5亿
KHK4083	不适用	抗体	2021	安进	Kyowa Kirin	第三期临床准备就绪	12.5亿
Eucrisa®	**Crisaborole**	**PDE-4 抑制剂**	**2016**	**辉瑞**	**Anacor Pharma**	**第三期临床**	**52亿**
Elidel®	Pimecrolimus	钙调磷酸酶抑制剂	2011	梅达	诺华	商业化	4.2亿

主要参与方

Company	Existing Atopic Dermatitis Products
Pfizer	Eucrisa® Ointment
Incyte	Opzelura® Cream
Lilly	Ebglyss® Ab
LEO	Adbry® Ab Protopic® Ointment
sanofi	Dupixent® Ab
AMGEN	A Phase 3 Ab
Johnson&Johnson	One Phase 1 and One Phase 2 Ab

估值和首次公开募股时间表

	2025年	2026年	2027-2028	2029年
发展阶段	临床前	第一期临床试验	第二期临床试验	第三期临床试验
估值* (美元) *由TR Capital & Partners 估值	**5000万**	**3.64亿**	**6.98亿**	**25.97亿 → 首次公开募股**

投资机会

种子轮（2026年）：集资**500万**美元

年	阶段	公司估值*（美元）	倍数**
2023年 （预种子轮）	临床前	2500万	-
2025年	临床前	5000万	-
2026年	一期临床试验	3.64亿	7.3倍
2027年	二期临床试验	6.98亿	14倍
2029年 （首次公开募股）	三期临床试验	25.97亿	52倍

*由TR Capital & Partners 估值

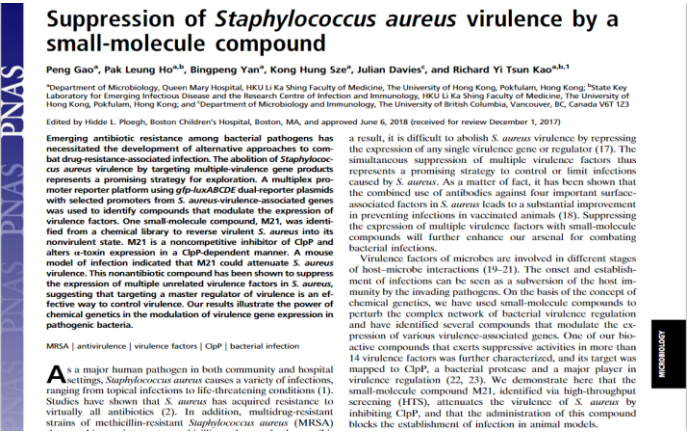
**估值倍数基于5000万美元的估值计算，该估值通过现金流折现法（DCF）得出，较2.47亿美元基准价折价67%

发展路线图及募集资金用途

	2024 年下半年	2025 年上半年	2025 年下半年	2026 年上半年	2026 年下半年	2027 年上半年	2027 年下半年	2028 年上半年	2028年下半年	2029 年上半年	2029 年下半年
ABL-1: 特应性皮肤炎外用治疗											
(i) 准备临床前研究											
(ii) 临床前研究											
(iii) IND 准备/提交											
(iv) 第一阶段 临床试验											
(v) 第二阶段 临床试验											
(vi) 第三阶段 临床试验											
估值（百万美元）*					364	364	698	698	698	2,597	2,597
募集资金（美元）			**种子轮（500万）**		-	A轮（3,000万）	-	首次公开募股前（6,000万）	-	-	首次公开募股（待定）
收益的用途 （百万美元）				1.5	1.5	2	4	6	10	20	30

*由TR Capital & Partners 估值

得到香港大学开创性科研文献的支持



PNAS

Suppression of *Staphylococcus aureus* virulence by a small-molecule compound

Peng Gao[a], Pak Leung Ho[a,b], Bingpeng Yan[a], Kong Hung Sze[a], Julian Davies[c], and Richard Yi Tsun Kao[a,b,1]

[a]Department of Microbiology, Queen Mary Hospital, HKU Li Ka Shing Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong; [b]State Key Laboratory for Emerging Infectious Disease and the Research Centre of Infection and Immunology, HKU Li Ka Shing Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong; and [c]Department of Microbiology and Immunology, The University of British Columbia, Vancouver, BC, Canada V6T 1Z3

Edited by Hidde L. Ploegh, Boston Children's Hospital, Boston, MA, and approved June 6, 2018 (received for review December 1, 2017)

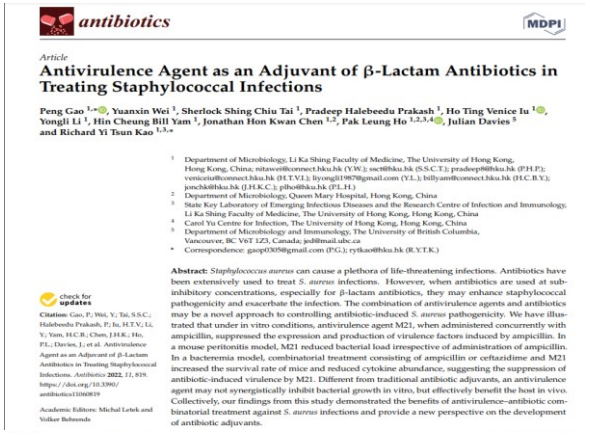
Emerging antibiotic resistance among bacterial pathogens has necessitated the development of alternative approaches to combat drug-resistance-associated infection. The abolition of *Staphylococcus aureus* virulence by targeting multiple-virulence gene products represents a promising strategy for exploration. A multiplex promoter reporter platform using *gfp-luxABCDE* dual-reporter plasmids with selected promoters from *S. aureus*-virulence-associated genes was used to identify compounds that modulate the expression of virulence factors. One small-molecule compound, M21, was identified from a chemical library to reverse virulent *S. aureus* into its nonvirulent state. M21 is a noncompetitive inhibitor of ClpP and alters α-toxin expression in a ClpP-dependent manner. A mouse model of infection indicated that M21 could attenuate *S. aureus* virulence. This nonantibiotic compound has been shown to suppress the expression of multiple unrelated virulence factors in *S. aureus*, suggesting that targeting a master regulator of virulence is an effective way to control virulence. Our results illustrate the power of chemical genetics in the modulation of virulence gene expression in pathogenic bacteria.

MRSA | antivirulence | virulence factors | ClpP | bacterial infection

As a major human pathogen in both community and hospital settings, *Staphylococcus aureus* causes a variety of infections, ranging from topical infections to life-threatening conditions (1). Studies have shown that *S. aureus* has acquired resistance to virtually all antibiotics (2). In addition, multidrug-resistant strains of methicillin-resistant *Staphylococcus aureus* (MRSA) a result, it is difficult to abolish *S. aureus* virulence by repressing the expression of any single virulence gene or regulator (17). The simultaneous suppression of multiple virulence factors thus represents a promising strategy to control or limit infections caused by *S. aureus*. As a matter of fact, it has been shown that the combined use of antibodies against four important surface-associated factors in *S. aureus* leads to a substantial improvement in preventing infections in vaccinated animals (18). Suppressing the expression of multiple virulence factors with small-molecule compounds will further enhance our arsenal for combating bacterial infections.

Virulence factors of microbes are involved in different stages of host–microbe interactions (19–21). The onset and establishment of infections can be seen as a subversion of the host immunity by the invading pathogens. On the basis of the concept of chemical genetics, we have used small-molecule compounds to perturb the complex network of bacterial virulence regulation and have identified several compounds that modulate the expression of various virulence-associated genes. One of our bioactive compounds that exerts suppressive activities in more than 14 virulence factors was further characterized, and its target was mapped to ClpP, a bacterial protease and a major player in virulence regulation (22, 23). We demonstrate here that the small-molecule compound M21, identified via high-throughput screening (HTS), attenuates the virulence of *S. aureus* by inhibiting ClpP, and that the administration of this compound blocks the establishment of infection in animal models.

MICROBIOLOGY



antibiotics MDPI

Article

Antivirulence Agent as an Adjuvant of β-Lactam Antibiotics in Treating Staphylococcal Infections

Peng Gao [1,*], Yuanxin Wei [2], Sherlock Shing Chiu Tai [3], Pradeep Halebeedu Prakash [3], Ho Ting Venice Iu [1], Yongli Li [3], Hin Cheung Bill Yam [3], Jonathan Hon Kwan Chen [1,2], Pak Leung Ho [1,2,3,4], Julian Davies [5] and Richard Yi Tsun Kao [1,3,*]

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Abstract: *Staphylococcus aureus* can cause a plethora of life-threatening infections. Antibiotics have been extensively used to treat *S. aureus* infections. However, when antibiotics are used at sub-inhibitory concentrations, especially for β-lactam antibiotics, they may enhance staphylococcal pathogenicity and exacerbate the infection. The combination of antivirulence agents and antibiotics may be a novel approach to controlling antibiotic-induced *S. aureus* pathogenicity. We have illustrated that under in vitro conditions, antivirulence agent M21, when administered concurrently with ampicillin, suppressed the expression and production of virulence factors induced by ampicillin. In a mouse peritonitis model, M21 reduced bacterial load irrespective of administration of ampicillin. In a bacteremia model, combinatorial treatment consisting of ampicillin or ceftazidime and M21 increased the survival rate of mice and reduced cytokine abundance, suggesting the suppression of antibiotic-induced virulence by M21. Different from traditional antibiotic adjuvants, an antivirulence agent may not synergistically inhibit bacterial growth in vitro, but effectively benefit the host in vivo. Collectively, our findings from this study demonstrated the benefits of antivirulence–antibiotic combinatorial treatment against *S. aureus* infections and provide a new perspective on the development of antibiotic adjuvants.

check for updates

Citation: Gao, P.; Wei, Y.; Tai, S.S.C.; Halebeedu Prakash, P.; Iu, H.T.V.; Li, Y.; Yam, H.C.B.; Chen, J.H.K.; Ho, P.L.; Davies, J.; et al. Antivirulence Agent as an Adjuvant of β-Lactam Antibiotics in Treating Staphylococcal Infections. *Antibiotics* **2022**, *11*, 819. https://doi.org/10.3390/antibiotics11060819

Academic Editors: Michal Letek and Volker Behrends

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RESEARCH ARTICLE

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Dehydrosqualene Desaturase as a Novel Target for Anti-Virulence Therapy against *Staphylococcus aureus*

Peng Gao,[a,b] Julian Davies,[d] Richard Yi Tsun Kao[a,b,c]

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ABSTRACT *Staphylococcus aureus*, especially methicillin-resistant *S. aureus* (MRSA), is a life-threatening pathogen in hospital- and community-acquired infections. The golden-colored carotenoid pigment of *S. aureus*, staphyloxanthin, contributes to the resistance to reactive oxygen species (ROS) and host neutrophil-based killing. Here, we describe a novel inhibitor (NP16) of *S. aureus* pigment production that reduces the survival of *S. aureus* under oxidative stress conditions. Carotenoid components analysis, enzyme inhibition, and *crtN* mutational studies indicated that the molecular target of NP16 is dehydrosqualene desaturase (CrtN). *S. aureus* treated with NP16 showed increased susceptibility to human neutrophil killing and to innate immune clearance in a mouse infection model. Our study validates CrtN as a novel druggable target in *S. aureus* and presents a potent and effective lead compound for the development of virulence factor-based therapy against *S. aureus*.

IMPORTANCE *S. aureus* staphyloxanthin contributes substantially to pathogenesis by interfering with host immune clearance mechanisms, but it has little impact on *ex vivo* survival of the bacterium. Agents blocking staphyloxanthin production may discourage the establishment and maintenance of bacterial infection without exerting selective pressure for antimicrobial resistance. Our newly discovered CrtN inhibitor, NP16, may offer an effective strategy for combating *S. aureus* infections.

KEYWORDS MRSA, anti-virulence, bacterial infection, staphyloxanthin

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Editor Victor J. Torres, New York University School of Medicine

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AMERICAN SOCIETY FOR MICROBIOLOGY | Microbiology Spectrum

RESEARCH ARTICLE

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Subinhibitory Concentrations of Antibiotics Exacerbate Staphylococcal Infection by Inducing Bacterial Virulence

Peng Gao,[a] Yuanxin Wei,[a] Rachel Evelyn Wan,[a] Ka Wing Wong,[a] Ho Ting Venice Iu,[a] Sherlock Shing Chiu Tai,[a] Yongli Li,[a] Hin Cheung Bill Yam,[a] Pradeep Halebeedu Prakash,[a] Jonathan Hon Kwan Chen,[a,b] Pak Leung Ho,[a,b,c,d] Kwok Yung Yuen,[a,b,c] Julian Davies,[e] Richard Yi Tsun Kao[a,c]

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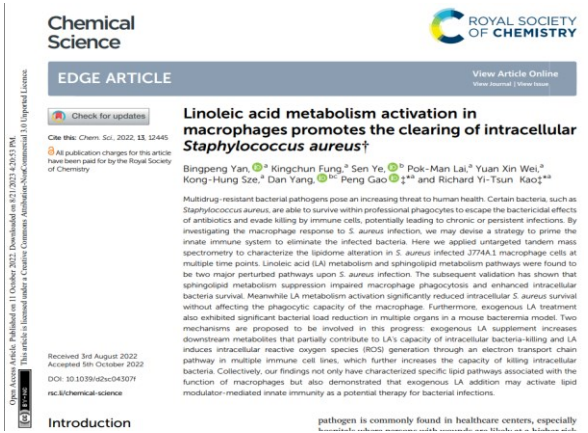
ABSTRACT Antibiotics are widely used for the treatment of bacterial infections. However, injudicious use of antibiotics based on an empirical method may lead to the emergence of resistant strains. Despite appropriate administration of antibiotics, their concentrations may remain subinhibitory in the body, due to individual variations in tissue distribution and metabolism rates. This may promote bacterial virulence and complicate the treatment strategies. To investigate whether the administration of certain classes of antibiotics will induce bacterial virulence and worsen the infection under *in vivo* conditions. Different classes of antibiotics were tested *in vitro* for their ability to induce virulence in a methicillin-resistant *S. aureus* strain Mu3 and clinical isolates. Antibiotic-induced pathogenicity was assessed *in vivo* using mouse peritonitis and bacteremia models. *In vitro*, β-lactam antibiotics and tetracyclines induced the expression of multiple surface-associated virulence factors as well as the secretion of toxins. In peritonitis and bacteremia models, mice infected with MRSA and treated with ampicillin, ceftazidime, or tetracycline showed enhanced bacterial pathogenicity. The release of induced virulence factors *in vivo* was confirmed in a histological examination. Subinhibitory concentrations of antibiotics belonging to β-lactam and tetracycline aggravated infection by inducing staphylococcal virulence *in vivo*. Thus, when antibiotics are required, it is preferable to employ combination therapy and to initiate the appropriate treatment plan, following diagnosis. Our findings emphasize the risks associated with antibiotic-based therapy and underline the need for alternative therapeutic options.

IMPORTANCE Antibiotics are widely applied to treat infectious diseases. Empirically



Chemical Science

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EDGE ARTICLE

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Linoleic acid metabolism activation in macrophages promotes the clearing of intracellular *Staphylococcus aureus*†

Bingpeng Yan,[a] Kingchun Fung,[a] Sen Ye,[b] Pok-Man Lai,[a] Yuan Xin Wei,[a] Kong-Hung Sze,[a] Dan Yang,[b,c] Peng Gao[a,‡,*] and Richard Yi-Tsun Kao[a,*]

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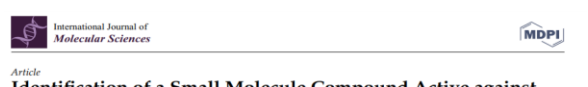
Introduction

pathogen is commonly found in healthcare centers, especially



International Journal of *Molecular Sciences* MDPI

Article

Identification of a Small Molecule Compound Active against Antibiotic-Tolerant *Staphylococcus aureus* by Boosting ATP Synthesis

Ho-Ting-Venice Iu [1], Pak-Ming Fong [2], Hin-Cheung-Bill Yam [1], Peng Gao [1], Bingpeng Yan [1], Pok-Man Lai [1], Victor-Yat-Man Tang [1], Ka-Ho Li [1], Chi-Wang Ma [2], King-Hei-Kenneth Ng [2], Kong-Hung Sze [1], Dan Yang [2], Julian Davies [3] and Richard-Yi-Tsun Kao [1,4,*]

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Abstract: Antibiotic tolerance poses a threat to current antimicrobial armamentarium. Bacteria at a tolerant state survive in the presence of antibiotic treatment and account for persistence, relapse and recalcitrance of infections. Antibiotic treatment failure may occur due to antibiotic tolerance. Persistent infections are difficult to treat and are often associated with poor prognosis, imposing an enormous burden on the healthcare system. Effective strategies targeting antibiotic-tolerant bacteria are therefore highly warranted. In this study, small molecule compound SA-558 was identified to be effective against *Staphylococcus aureus* that are tolerant to being killed by conventional antibiotics. SA-558 mediated electroneutral transport across the membrane and led to increased ATP and ROS generation, resulting in a reduction of the population of antibiotic-tolerant bacteria. In a murine chronic infection model, of which vancomycin treatment failed, we demonstrated that SA-558 alone and in combination with vancomycin caused significant reduction of MRSA abundance. Our results indicate that SA-558 monotherapy or combinatorial therapy with vancomycin is an option for managing persistent *S. aureus* bacteremia infection and corroborate that bacterial metabolism is an important target for counteracting antibiotic tolerance.

Keywords: MRSA; antibiotic tolerance; adjuvants; persistent infections; persister

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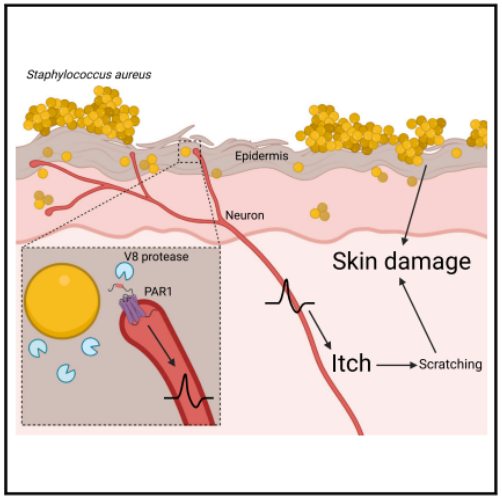
Citation: Iu, H.-T.-V.; Fong, P.-M.; Yam, H.-C.-B.; Gao, P.; Yan, B.; Lai, P.-M.; Tang, V.-Y.-M.; Li, K.-H.; Ma, C.-W.; Ng, K.-H.-K.; et al. Identification of a Small Molecule Compound Active against Antibiotic-Tolerant *Staphylococcus aureus* by Boosting ATP Synthesis. *Int. J. Mol. Sci.* **2023**, *24*, 6242. https://doi.org/10.3390/ijms24076242

Cell

Article

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 Africa/AdobeStock

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 allokneisis, 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.

创始人科研和创业成就

安腾诺华的创始人高一村博士是微生物学和药物研发领域的顶级科学家。 他因在传染病和药物研发方面20年的专注研究而受到广泛认可。 高博士取得各项高影响力成就的简历如下：

2003
- 跟名病毒学家何大一博士合作，研究利用融合肽抑制剂对抗沙士病毒

2004
- 建立世上首个病毒化学遗传学模型，展示化学遗传学可用于研究致病性病毒的治疗靶点
- 被《时代杂志》报道，并在时任中国总理温家宝访问期间获得表彰

2010
- 发现流感病毒核蛋白为可行的抗病毒靶点，并发现一种强效的新型核蛋白拮抗剂「Nucleozin」

Time Magazine, 2004

ASIA

Breaking the SARS Code

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

By BRYAN 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 in 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 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. Microscopic 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."

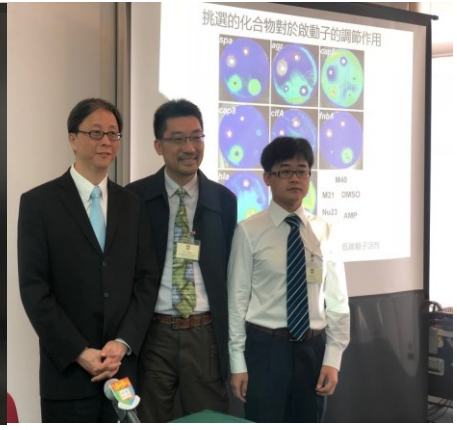
Around HKU, that's a question of when, not if. HKU's work on SARS and bird flu has helped transform a regional university into a world player in disease research, and its staff understand that they are part of a vital bulwark. "Hong Kong is a very strategic place to be for emerging-infectious-disease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

IN THE LAB: Kao unlocks the secrets of a virus

TIME, OCTOBER 4, 2004

23

2017
- 发现一种有效减少MRSA色素产生的抑制剂，并拟议使用新的非抗生素化合物「NP16」治疗MRSA感染的治疗方案
- 在瑞士日内瓦获得国际预防和控制感染联盟(ICPIC)举办的「创新学院奖」



创新学院奖

2018
- 发现一种新的有效降低MRSA毒力表达的抑制剂，并拟议使用新的非抗生素化合物M21治疗MRSA感染的治疗方案

2019
- 獲得「國家科學技術進步獎 (二等獎)」
- 成立安騰諾華生物科技有限公司

2023
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