

Medical Museum snapshot

香港醫學博物館 通訊



齊抗超級細菌 FIGHTING THE SUPERBUGS

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傳染病至今仍嚴重威脅人類及動物健康，而抗微生物劑依然是治療感染的基石。

抗生素是甚麼？

不同類型的抗微生物劑可以殺死或抑制不同微生物（如細菌、病毒、真菌及寄生蟲等）的生長。針對細菌的抗微生物劑通常被稱為抗生素。抗生素一般對病毒無效。

抗生素時代始於二十世紀初，當時發現了可以治療傳染病的化學物質，例如水銀（汞）化合物，有機砷化合物，以及磺胺藥等。阿歷山大·弗萊明發現盤尼西林（青霉素），並於1940年代廣泛使用，開啟安全而高效的現代抗生素時代。抗生素被譽為神奇藥物。

「超級細菌」的崛起

抗生素耐藥性

盤尼西林及大多數其他抗生素在臨床使用後不久，醫學界便檢測到耐藥性。細菌對使用的抗生素發生改變，不但沒被殺死或抑制，仍能夠生存或繁殖。

耐藥機制

耐藥性可能源於細菌天生對某些抗生素具抗藥性，或透過基因突變或從其他細菌轉移可動遺傳因子而獲取新基因，繼而發展出新的耐藥性機能，例如製造酵素來分解抗生素化合物、改變靶點的結構、降低細菌細胞表面滲透性令抗生素份子無法進入細胞，主動從細菌細胞排走抗生素化合物，又或以上機能的組合。

多重耐藥性細菌

理論上，若細菌對某一類抗生素出現耐藥性，其他具有不同化學結構的抗生素仍可能有效。不幸的是，很多細菌都對多種抗生素耐藥，成為「多重耐藥性細菌」（MDROs），一般人稱之為「超級細菌」。MDROs不一定是細菌。例如近期出現的是一種真菌名耳念珠菌（*Candida auris*）。

Infection remains a major threat to human and animal health even to this day, and antimicrobials are still the cornerstone in the treatment of infections.

What are antibiotics?

Different antimicrobials can kill or inhibit the growth of different micro-organisms such as bacteria, viruses, fungi, and parasites. Antimicrobials that specifically act against bacteria are referred to as "antibiotics". Antibiotics are generally not effective against viruses.

The "antibiotic era" began in the early twentieth century with the discovery of chemicals that can treat infectious diseases. For example, mercury and arsenic compounds, and sulpha drugs. The discovery of penicillin by Alexander Fleming and its widespread use in the 1940s marked the beginning of the modern antibiotic era. Safe and highly effective antibiotics were hailed as wonder drugs.

Rise of the Superbugs

Antibiotic resistance

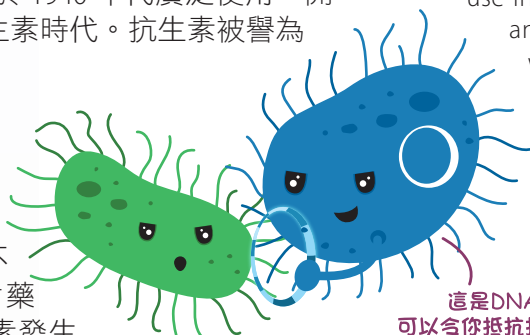
Soon after the introduction of penicillin and most other antibiotics into clinical use in humans or animals, bacteria were detected to be able to survive or grow despite the antibiotic that previously could kill or inhibit them.

Resistance mechanisms

Bacteria are antibiotic-resistant because some may be innately resistant to certain antibiotics. Others may have developed new mechanisms of resistance through mutation or acquisition of new genes through transfer of mobile genetic elements from other bacteria. Examples of such mechanisms include production of enzymes which break down the antibiotic compounds, changes in the target sites, reduced permeability of the bacterial cell surface so that the antibiotic molecules cannot enter the bacterial cells, actively pumping the antibiotic compound out of the cells, or combinations of the above mechanisms.

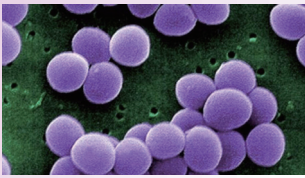
MDROs

Theoretically, when bacteria are resistant to one group of antibiotics, other antibiotics with different chemical structures may be effective. Unfortunately, antibiotic resistance to multiple groups of antibiotics is common. These bacteria are "multi-drug resistant organisms" (MDROs), loosely referred to in the popular media as "superbugs." A superbug is not necessarily a bacterium. For example, one of the latest superbugs is a fungus named *Candida auris*.



這是DNA，
可以令你抵抗抗生素！
Here is DNA that will give you
antibiotic resistance!

多重耐藥性細菌表表者
Some clinically important MDROs



金黃葡萄球菌
Staphylococcus aureus



結核分枝桿菌
Mycobacterium tuberculosis

甚麼驅使細菌產生耐藥性？

濫用抗生素

單靠基因突變和適者生存，抗生素耐藥性也許不會進化得如此迅速。那麼，甚麼加速了它的發展？

人類和畜牧業誤用和過度使用抗生素是耐藥性的最重要驅動力。

畜牧業大量使用抗生素，不單是用於治療動物疾病，而是為促進動物的生長和預防感染。在食用動物中發現的細菌，竟然包括對「終極殺手鐮」抗生素（例如粘桿菌素 Colistin）耐藥的細菌。

細菌通過可移動遺傳因子，轉移抗性基因的能力，亦助長細菌耐藥性傳播，而當今頻繁的跨國旅遊亦起了推波助瀾作用。

為何要擔心細菌耐藥性？

動物體內的抗生素耐藥性細菌污染食物鏈及環境，甚至醫療設施。

多重耐藥性細菌所造成的感染極難醫治，因為可選用的抗生素非常有限，而且療效可能較低，副作用更為嚴重。這些感染為全球帶來大量疾病、死亡、及經濟負擔。

若缺乏有效的抗生素，越來越多常見感染可能無法或更難治癒；器官移植、化療、手術、甚至小型醫療程序等亦可能變得越來越危險。

鑑於形勢的嚴峻，世界衛生組織於 2019 年把抗微生物劑耐藥性列為威脅全球健康十害之一。

如何減慢細菌耐藥性的產生？

細菌耐藥性趨勢難以逆轉，唯有想辦法令其步伐緩慢下來，讓目前有效的抗生素可以盡量持續使用，和新型抗生素得以及時開發。

防止超級細菌，由自己做起 You can help reduce antibiotic resistance



僅在需要時才服用抗生素，包括不主動向醫生要求抗生素，按醫生指示完成整個抗生素治療，不要在沒有處方的情況下自行購買抗生素服用
Take antibiotics only when they are needed, including not actively requesting antibiotics from your doctor, finishing the antibiotics treatment, and not buying antibiotics without a prescription.



保持雙手及廚具清潔，分開處理生、熟食物。
Maintain good hand and kitchen hygiene
Keep your hands and kitchen utensils clean. Handle raw food separately from cooked food.



徹底煮熟肉類製品
Cook meat products thoroughly



在適當情況下接種疫苗防止感染
Prevent infection by vaccination when appropriate

Why does antibiotic resistance occur?

Misuse of antibiotics

Left to genetic mutation and natural selection, antibiotic resistance may not have evolved so rapidly. What then accelerated its development?

Misuse and overuse of antibiotics in humans and animal husbandry are probably the two most important drivers of antibiotic resistance development. The biggest volumes of antibiotics used in food animals are not for the treatment of animal diseases, but for growth promotion and prevention of infections. Antibiotic-resistant bacteria found in food animals include those that are resistant to "last resort" antibiotics such as colistin.

The ability of bacteria to transfer resistance genes through mobile genetic elements is another potent factor fuelling the spread of antibiotic resistance, often coupled with the ease of international travel nowadays.



抗生素處方過多
Over-prescribing of antibiotics



畜牧業和魚類業養殖中過度使用抗生素
Over-use of antibiotics in livestock and fish farming



患者沒有完成整個
抗生素處方治療
Patients not finishing their antibiotic treatment

個人及環境衛生欠佳
Inadequate hygiene, poor sanitation

Why should we be worried about antibiotic resistance?

Antibiotic-resistant bacteria in animals contaminate the food chain and the environment, even healthcare facilities.

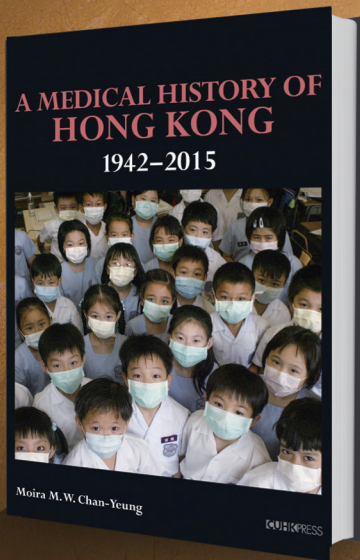
Infections due to MDROs are very difficult to treat because the antibiotic choices are very limited, efficacy could be lower, and the side effects often more significant. Such infections carry substantial morbidity, mortality, and economic burden globally.

Without effective antibiotics, more and more common infections may become untreatable or more difficult to manage; organ transplantations, chemotherapy, surgeries, and even minor medical procedures may become much more dangerous.

Indeed, in response to the enormity of the situation, the World Health Organization listed antimicrobial resistance as one of ten threats to global health in 2019.

What can be done?

The trend of antibiotic resistance is unlikely to be reversible. What can possibly be achieved is to slow down its pace so that currently effective antibiotics can continue to work for as long as possible and new antibiotics can be developed in time.



A MEDICAL HISTORY OF HONG KONG 1942 - 2015

Moira M.W. Chan-Yeung

"This book presents an unbiased and scientific analysis of events which prompted the authorities and the public to consider, evaluate, and ultimately implement policies that resulted in the gradual improvement of the healthcare system in Hong Kong." — Rosie T. T. Young, The University of Hong Kong

HK\$360 (Enjoy 15% off discount at the Hong Kong Museum of Medical Sciences)

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香港醫學博物館籌款晚宴順利舉行，衷心感謝各位贊助商及支持者。

The Hong Kong Museum of Medical Sciences is deeply grateful to our generous sponsors and supporters for another successful fundraising event to support the works of the Museum.



▲ From left: Ms Rachel Fan (Organizing Committee Member), Prof Tony Mok (Dinner Chairman), Dr Donald Li (Guest of Honour) & Ms Heidi Chu (MC)
左起：范思亮女士（籌委會會員）、莫樹錦教授（晚宴主席）、李國棟醫生（主禮嘉賓）及朱凱婷小姐（司儀）



▲ Our emerald sponsor (centre) Dr Susan Fan & Dr Macor Wan. 翡翠贊助商（中間）范瑩孫醫生及尹鎮偉醫生



▲ Heartfelt thanks to Mr Simon To, Vice-Patron of HKMMSS (right) 衷心感謝博物館學會副贊助人杜振源先生慷慨支持



▲ Ms Cleo Cheung and her teacher from Russia in a captivating dance performance. Ms Cleo Cheung 和她的俄羅斯舞蹈老師獻上動人心弦的表演



▲ A very special dainty art piece donated by Ms Edna Cha for auction. 感謝查傳訥女士捐贈精緻獨特的藝術品給大會拍賣。



◀ Which item is attracting Mrs Purviz R Shroff's attention? 那個拍賣品得到 Mrs Purviz R Shroff 垂青呢？



◀ Ms Sara Mao, the volunteer auctioneer, invited the audience to raise their paddles and bid. 義務拍賣官毛國靖女士呼籲大家為慈善出一分力。

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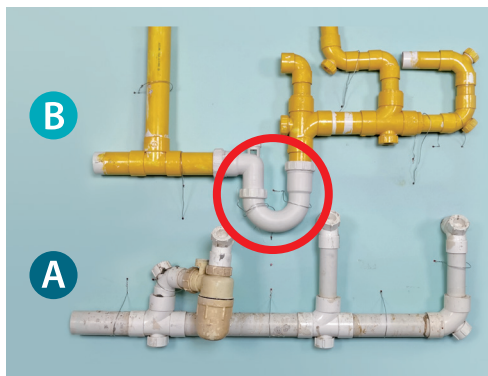
學習歷史 迎接未知

WELL PREPARED FOR THE UNKNOWN



十七年前沙士在港爆發期間，你身處哪裡呢？還在求學嗎？抑或和他們一樣，已經在不同崗位上，與香港人一起應戰？「沙士口述歷史檔案精選」紀錄了多位醫療業界及不同界別的人士昔日的親身經歷，他們汲取的教訓成為我們今天向前作戰的勇氣。詳情請登入博物館網頁 (www.hkms.org.hk)，於「開始探索」欄目內即時探索！

Where were you during the SARS outbreak in Hong Kong 17 years ago? Still in school? Or, were you already at work and fighting the outbreak together with the rest of Hong Kong? "SARS Oral History Archives" records the experiences of a wide spectrum of those involved within and outside the health care sector. The lessons learnt can help us better prepare for the challenges of today. To find out more, go to the Museum website www.hkms.org.hk "Explore Now" column.



◀ 水管 A 是淘大花園在 2003 年沙士爆發期間所使用的外置排水水管。政府及世界衛生組織的調查結論均認為多個單位的地台排水口隔氣彎管乾涸，是其中一個環境因素導致疾病爆發。水管 B 是排水系統的新設計規定。住戶只須定期把清水倒進排水口，便可確保 U 形隔氣彎管正常運作，防止臭氣和受污染的液滴從污水排放系統進入住宅內。

Pipe A is the outdoor section of drainage pipe used in Amoy Gardens at the time of SARS outbreak in 2003. Both investigations of the Government and the World Health Organisation concurred that drying up of floor drain traps in many apartments there, was one of the environmental factors that had given rise to the outbreak. Pipe B is the new design requirements for the drainage systems. It is important for occupants to ensure the proper functioning of the U-traps by filling them with water regularly. Such a simple act will help prevent foul smell and any contaminated droplets from the drainage system gaining entry into the living areas.

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開放時間

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星期日及公眾假期 下午1時至5時

Opening Hours

Tuesday to Saturday 10 am to 5 pm
Sunday and Public Holidays 1 pm to 5 pm

入場門票

\$20 成人
\$10 小童、全日制學生、六十歲以上長者或殘疾人士
\$50 家庭套票 (包括兩位成人及最多三位小童使用)

Admission Fee

\$20 Adults
\$10 Children, full-time students, senior citizens (aged 60 or above) and disabled persons
\$50 Family Package (2 adults and maximum of 3 children)

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