

ASX/Media Release  
13 March 2020

## Antimicrobial platform update and launch of BTX 1801 clinical study

### Key highlights

- Botanix has launched the next phase of development of its cannabinoid antimicrobial platform, with BTX 1801 initially targeting the prevention of surgical site infections (SSIs)
- New pre-clinical data demonstrates synthetic cannabidiol kills MRSA bacteria within 10 minutes by a novel mechanism of action and is a highly effective skin decolonisation agent
- New findings in combination with previous pre-clinical work, supports BTX 1801 as an ideal candidate for nasal decolonisation of *Staph* and *MRSA* for the prevention of SSIs
- Patients colonised with *Staph* at ICU admission are ~15 times more at risk, compared with non-colonised patients
- BTX 1801 Phase 2a clinical study is designed to generate proof of concept data to support rapid progression into a pivotal clinical study for FDA registration

**Philadelphia PA and Sydney, Australia, 13 March 2020:** Clinical stage synthetic cannabinoid company Botanix Pharmaceuticals Limited (ASX:BOT, “Botanix” or “the Company”) is pleased to announce significant progress with its antimicrobial platform and the commencement of a Phase 2a clinical study for its lead program BTX 1801, targeting the prevention of surgical site infections (SSIs).

A presentation providing an overview of anti-microbial resistance, pre-clinical data, target indication, Botanix’s antimicrobial platform and BTX 1801 clinical program is attached to this release.

**Botanix Executive Chairman and President Vince Ippolito commented:** “Antibiotic resistance continues to be a significant global health issue, with no new classes of antibiotics receiving FDA approval in more than three decades, despite the availability of significant funding initiatives and regulatory incentives.

“We are excited to be launching our first clinical program from our antimicrobial platform. The development of BTX 1801 for the prevention of SSIs diversifies our clinical pipeline and opens up a separate business line for Botanix outside our mature dermatology programs.”

One of the most troublesome resistance forming bacteria worldwide is *Staphylococcus aureus* (*‘Staph’*). In particular, Methicillin-resistant *Staphylococcus aureus* (*‘MRSA’* or *‘Golden Staph’*) is increasingly becoming a major global healthcare concern. *Staph* and *MRSA* are the leading cause of SSIs<sup>1</sup> and approximately 80% of SSIs are caused by the patient infecting themselves from their own nose, where *Staph* and *MRSA* can colonise. Global health authorities are now increasingly mandating the use of nasal decolonisation prior to surgery<sup>2</sup>, however antibiotics used for nasal decolonisation

<sup>1</sup> Decolonization to Reduce Postdischarge Infection Risk among MRSA Carriers, Huan et al Feb 14 2019, N Engl J Med 2019; 380:638-650

<sup>2</sup> Preventing Surgical-Site Infections in Nasal Carriers of *Staphylococcus aureus* Jan 2010, Bode et al N Engl J Med 2010; 362:9-17

(e.g. Bactroban™ also known as *mupirocin*) have seen a significant increase in the development of resistance, with some hospitals recording resistance rates as high as 95% making it less than ideal for use<sup>2</sup>. For additional information, refer to sections “Background – Anti-microbial resistance” and “First Target – Prevention of surgical site infection” in the attached presentation.

Peer reviewed publications also identify the significant risk that nasal colonisation with *Staph* presents to patients entering the intensive care unit (ICU) and who may require ventilation. Patients colonised with *Staph* at ICU admission, had an up to 15 times increased risk for developing pneumonia compared with non-colonised patients.<sup>3</sup>

New data released today, demonstrates synthetic cannabidiol rapidly kills MRSA bacteria within 10 minutes of exposure, by a novel mechanism of action, and without allowing resistance to develop. Furthermore, studies conducted by Botanix have shown that BTX 1801 is more effective than the market leading decolonisation agent, *mupirocin*, at decolonising MRSA and mupirocin resistance strains of MRSA were utilized in the industry-accepted pig skin decolonisation model. This combined with previous work showing that MRSA bacteria lack the ability to develop resistance to cannabidiol, makes BTX 1801 an ideal candidate for nasal decolonisation of *Staph* and MRSA for the prevention of SSIs. For additional information, refer to sections “Synthetic Cannabidiol’s Unique Anti-Microbial Effects” and “First Target – Prevention of surgical site infection” in the attached presentation.

In light of these results, Botanix has designed a double-blind, vehicle-controlled Phase 2a study to evaluate safety, tolerability and efficacy of two formulations of BTX 1801 to decolonise *Staph* and MRSA from the nose of healthy adults. Given one in three people in the community carry *Staph* and/or MRSA in their nose on average, this study population is ideal to establish proof of efficacy of BTX 1801, before moving into a pivotal clinical study involving patients undergoing surgery, for FDA registration. As a result, this clinical study can also be completed efficiently and is highly cost effective, as it will only involve 60 volunteers with a treatment period of five days. Final preparations for the BTX 1801 Phase 2a study are now underway and Botanix expects to enrol its first participants early in 2Q CY2020. For additional information, refer to “BTX 1801 Program” section in attached presentation.

Release authorised by

**Vince Ippolito**

President and Executive Chairman

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<sup>3</sup> Staphylococcus aureus colonization at ICU admission as a risk factor for developing S. aureus ICU pneumonia, May 2016 Vol 23, Paling et al, Clinical Microbiology and Infection, 49.e9-49.e14

## About Botanix Pharmaceuticals

Botanix Pharmaceuticals Limited (ASX:BOT) is a clinical stage synthetic cannabinoid company based in Perth (Australia) and Philadelphia (USA) committed to the development of pharmaceutical products that are underpinned by science and supported by well-controlled randomised clinical trials. The Company has two separate cannabinoid development platforms, the first focusing on dermatology and the second on the development of antimicrobial products, both of which leverage the unique anti-inflammatory, immune modulating and antimicrobial properties of cannabinoids, particularly synthetic cannabidiol. Botanix has an exclusive license to use a proprietary drug delivery system (Permetrex™) for direct skin delivery of active pharmaceuticals in all skin diseases.

The Company has announced data from its Phase 2 acne patient study and is preparing for the end of Phase 2 meeting with the FDA. A Phase 2 patient study in atopic dermatitis is now fully recruited with data planned for 1Q CY2020 and its new Phase 1b rosacea study recently received ethics approval. The Company is separately developing a pipeline of product candidates that leverages the antimicrobial properties of cannabinoids with first enrolment for BTX 1801 Phase 2a study for the prevention of surgical site infections expected in early 2Q CY2020

To learn more please visit: <https://www.botanixpharma.com/>

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## Cautionary Note on Forward-Looking Statements

Any statements in this press release about future expectations, plans and prospects for the Company, the Company's strategy, future operations, and other statements containing the words "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "predict," "project," "target," "potential," "will," "would," "could," "should," "continue," and similar expressions, constitute forward-looking statements. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including: the Company's ability to successfully develop its product candidates and timely complete its planned clinical programs and the Company's ability to obtain marketing approvals for its product candidates. In addition, the forward-looking statements included in this press release represent the Company's views as of the date hereof. The Company anticipates that subsequent events and developments will cause the Company's views to change. However, while the Company may elect to update these forward-looking statements at some point in the future, the Company specifically disclaims any obligation to do so. These forward-looking statements should not be relied upon as representing the Company's views as of any date subsequent to the date hereof.



**botanix**  
PHARMACEUTICALS

RESTORING HEALTHY SKIN

# ANTI-MICROBIAL PLATFORM

## Overview and BTX 1801 Program

March 2020

# Executive Summary

Cannabinoids are emerging as a safe and effective new class of antibiotics for the treatment of a range of bacterial infections – for skin and other applications

## Slide 3 | Problem of resistance

Resistance to available antibiotics is a significant global issue, with no new classes of antibiotics approved in more than three decades despite significant funding and regulatory incentives

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## Slide 7 | Powerful antibiotics

Synthetic CBD is a powerful new gram-positive antibiotic with rapid bactericidal activity operating by a novel mechanism of action that prevents the development of resistance

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## Slide 17 | Significant market

Initial indication for BTX 1801 is the prevention of surgical site infections (SSIs) through the decolonisation of *S. aureus* from the nose targeting more than 300 million surgeries each year

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## Slide 23 | Rapid clinical development

Fast Phase 2 study in healthy volunteers will generate proof of concept data allowing rapid progression into pivotal studies for FDA registration

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## Slide 26 | Summary

The newly characterised antimicrobial profile of synthetic CBD represents an exciting new platform for standalone products for a range of human (and animal) bacterial infections

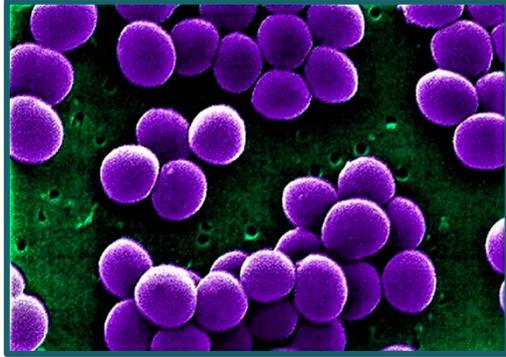
# BACKGROUND

## Anti-microbial resistance



# Staphylococcus aureus and methicillin resistant S. aureus (MRSA)

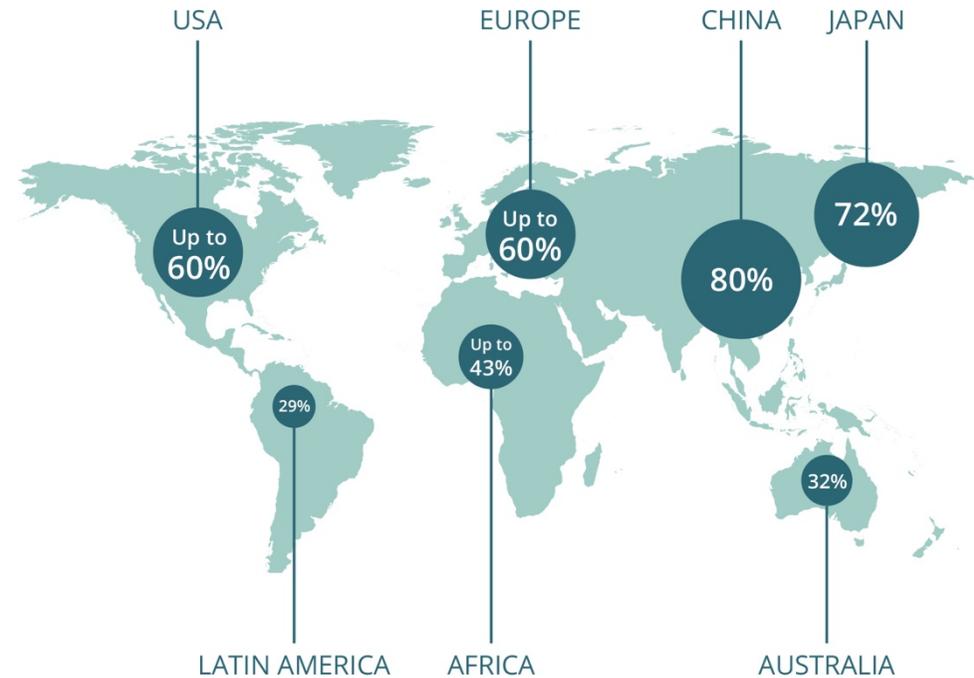
*S. aureus* infections cost the US economy up to US\$10 billion per annum, with 40 million surgical patients “at risk” of *S. aureus* infections and 20 million patients at “high infection risk”<sup>1</sup>



**Staphylococcus aureus (S. aureus or SA)** is a type of bacteria found on human skin, in the nose, armpit, groin and other areas and while it is the leading cause of skin and soft tissue infections, SA can also cause more serious infections, such as pneumonia, bloodstream infections, as well as heart, bone and joint infections<sup>2</sup>

**Methicillin Resistant Staphylococcus aureus (MRSA)** is a type of SA that is resistant to the antibiotics generally used to treat the bacteria. MRSA infections must therefore be treated with special antibiotics which limit treatment options, have more side effects and are very expensive<sup>3</sup>

## S. aureus as a major cause of hospital infections<sup>1</sup>

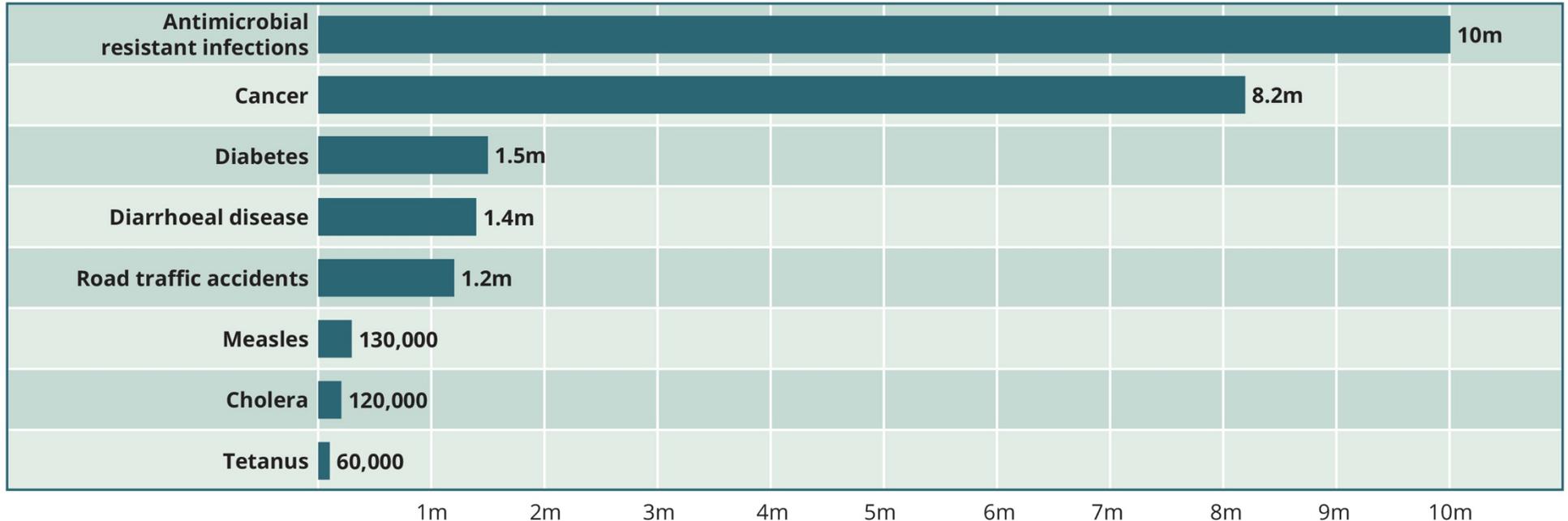


1. Ban KA, Minei JP, Laronga C, et al. American College of Surgeons and Surgical Infection Society: Surgical site infection guidelines, 2016 update. J Am Coll Surg. 2017;1:59-74.
2. [https://apic.org/monthly\\_alerts/staphylococcus-aureus/](https://apic.org/monthly_alerts/staphylococcus-aureus/)
3. <https://www.cdc.gov/mrsa/index.html>

# The era of resistance to antibiotics

Antimicrobial resistant infections are growing rapidly and will soon outpace cancer as the most common cause of death globally

Forecast deaths attributable to antimicrobial resistance (AMR)<sup>1</sup>



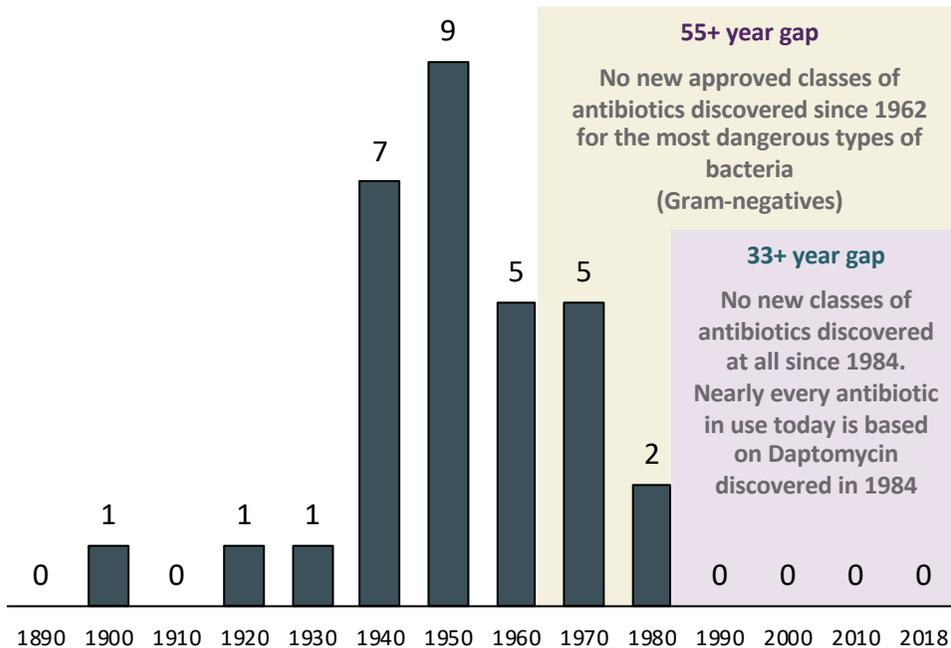
Estimates predict that by 2050, 10m lives per annum will be at risk

1. Tackling Drug Resistant Infections Globally Final Report and Recommendations (2016), The Review on Antimicrobial Resistance

# No new antibiotics have been discovered in over three decades

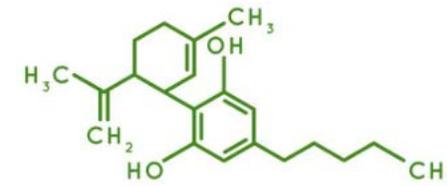
No new approved class of antibiotics has been discovered since 1984 and no new class of antibiotics has been discovered to treat Gram-negative bacteria since 1962

Number of antibiotic classes discovered or patented<sup>1</sup>



## CANNABINOIDS

### NEW CLASS OF ANTIBIOTICS



Structural activity characterised by  
*Botanix – IP Position secured*

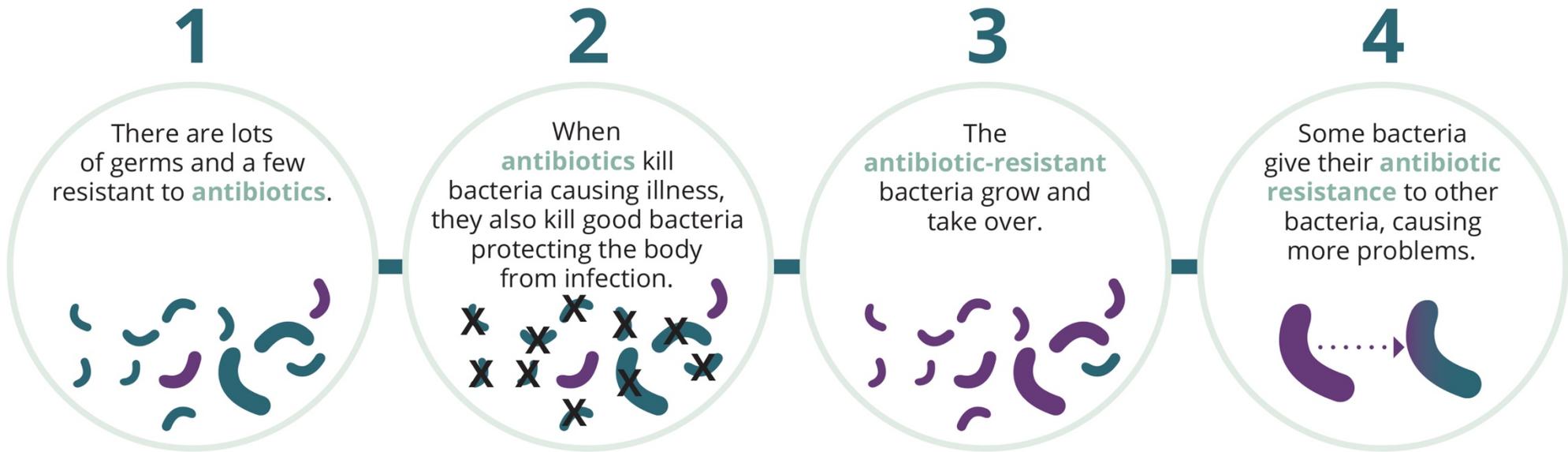
### EXAMPLES

Cannabidiol, CBD Analogs,  
Cannabigerol

1. Pew Charitable Trusts; Deak et al. Progress in the Fight Against Multidrug Resistant Bacteria?; A Review of FDA Approved Antibiotics 2010-2015. 31 May 2016. DOI: 10.7326/M16-0291

# How antibiotic resistance develops

When bacteria survive exposure to antibiotics that would normally eliminate them, these surviving bacteria grow and spread resistance – leading to the emergence of “superbugs”



Failure of “first-line” antibiotics requires physicians to use stronger, more toxic alternatives, which in turn enhances the likelihood of developing further resistance and the exhaustion of limited treatment options available<sup>1</sup>

1. Centers for Disease Control and Prevention - <https://www.cdc.gov/mrsa/index.html>

# Increasing global focus on drug resistance

Favourable market dynamics underpinned by increasing awareness on drug resistance globally, and numerous regulatory incentives and funding initiatives available

## Increased global awareness

- Antimicrobial resistance (AMR) is a **significant global public health issue** currently
- Many countries have developed a **dedicated and comprehensive plan** to deal with AMR



Source: Antimicrobial Resistance. Library of National Action Plans. World Health Organisation (WHO), 2017

## Regulatory incentives and funding initiatives

- Potential for **additional regulatory exclusivity** (extra five years – total of 10 years exclusivity) makes economic benefits from achieving FDA approval very attractive
- FDA's priority review potentially leads to **faster development pathway**
- Potential for **increased pricing** for resistant patient populations (in certain jurisdictions)
- Key legislation: GAIN Act; 21st Century Cures Act

## Funding sources

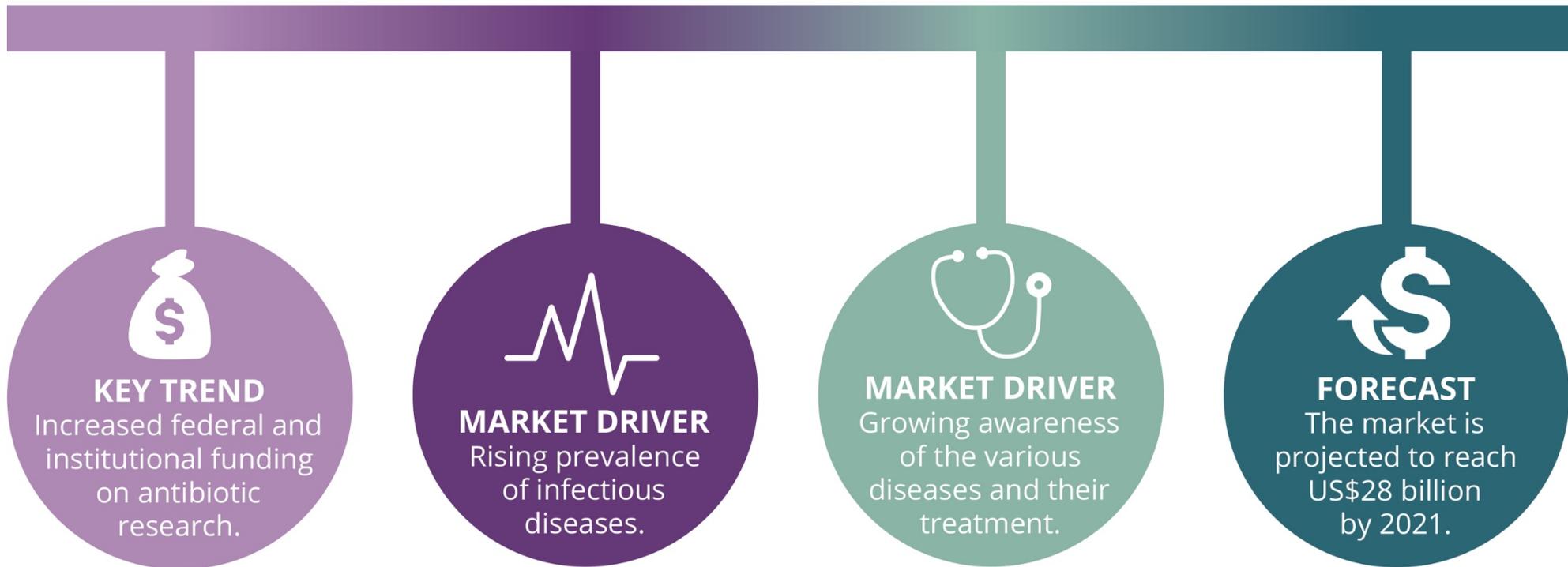
- **Non-dilutive funding** potentially available in various regions
- Potential sources<sup>1</sup>: BARDA (US); IMI (EU); NARS (AU); CARB-X

1. Simpkin, Victoria L et al. "Incentivising innovation in antibiotic drug discovery and development: progress, challenges and next steps." The Journal of antibiotics vol. 70,12 (2017): 1087-1096. doi:10.1038/ja.2017.124

# Global antibiotics market is significant

Cannabinoids have a significant opportunity to penetrate the large global antibiotic market both for topical and other applications

## GLOBAL ANTIBIOTICS MARKET <sup>1</sup>



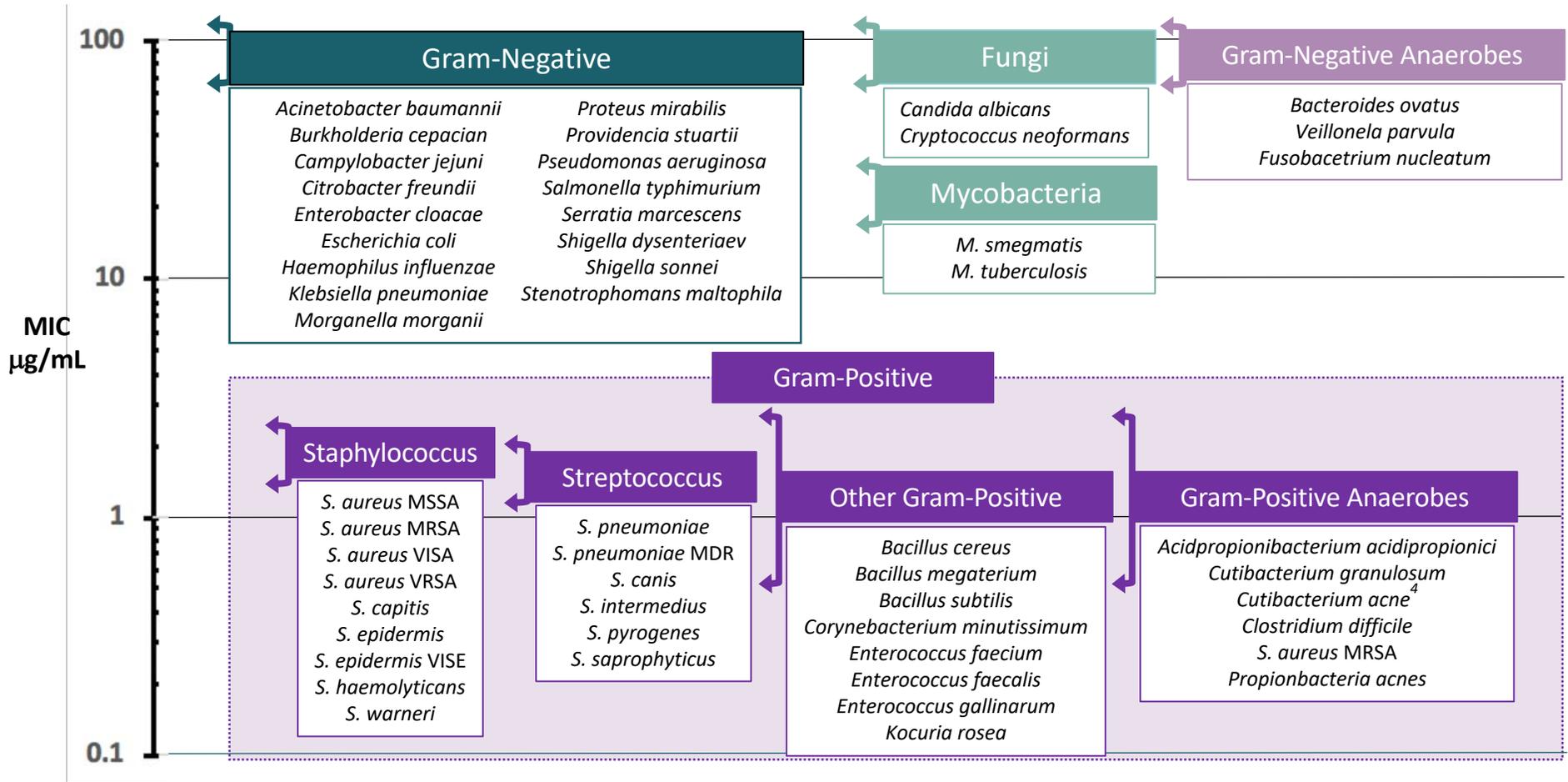
1. Global Antibiotics Market 2017-2021 Report: Technavio 2017

# Synthetic Cannabidiol's Unique Anti-Microbial Effects



# CBD is a broad-spectrum Gram-positive antibiotic

CBD is a powerful new antibiotic that is effective against a range of problematic Gram-positive bacteria at MICs comparable to currently approved antibiotics<sup>1, 2 & 3</sup>



1. Based on testing conducted by the University of Queensland – BOT data on file  
 2. Based on testing conducted by the Micromyx – BOT data on file  
 3. Based on testing conducted by Monash University – BOT data on file  
 4. Formerly known as *Propionibacteria acnes*

# Remarkable activity against MRSA without inducing resistance

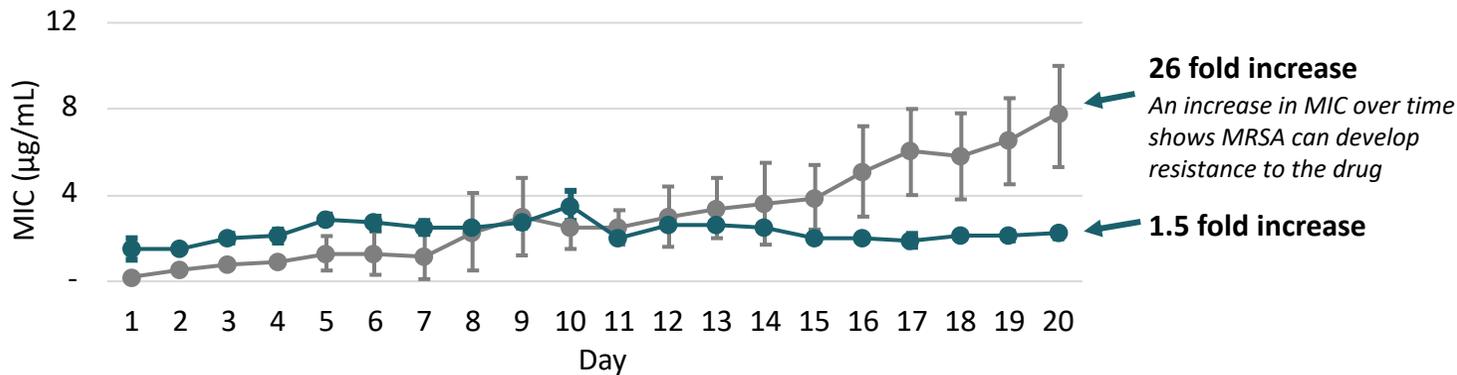
CBD shows remarkable activity against 132 isolates of *S. aureus* and MRSA<sup>1</sup>

## Antibiotic Minimum Inhibitory Concentration (MIC) comparison<sup>1</sup>

Antibiotic	<i>S. aureus</i> all isolates (mg/mL)			MRSA <sup>1</sup> (mg/mL)		MSSA <sup>2</sup> (mg/mL)	
	MIC <sub>50</sub>	MIC <sub>90</sub>	Range	MIC <sub>50</sub>	MIC <sub>90</sub>	MIC <sub>50</sub>	MIC <sub>90</sub>
CBD	2	4	0.25 - 8	2	2	2	4
Mupirocin	0.5	0.5	0.125 – 64	0.5	0.5	0.5	0.5
Vancomycin	1	2	0.5 – 64	1	1	1	2
Daptomycin	2	4	0.5 – 16	2	2	2	4
Clindamycin	0.125	64	0.03 – 64	0.125	0.1875	0.125	64

MIC<sub>50</sub> = min conc to inhibit growth of 50% of isolates. MIC<sub>90</sub> = min conc to inhibit growth of 90% of isolates. MRSA = methicillin resistant *S. aureus*. MSSA = methicillin susceptible *S. aureus*

## MIC daily variability<sup>2</sup>



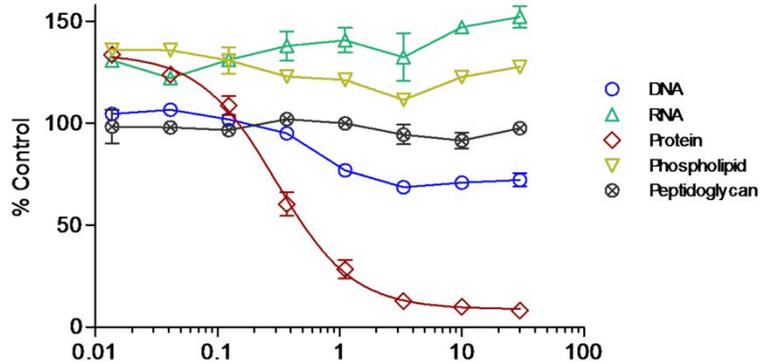
Repeat challenge experiments demonstrate that MRSA bacteria form resistance to commonly-used antibiotics such as daptomycin, but cannot form resistance to synthetic CBD

1. Based on testing conducted by the University of Queensland – BOT data on file  
 2. Based on an average of 8 replicates (University of Queensland – BOT data on file)

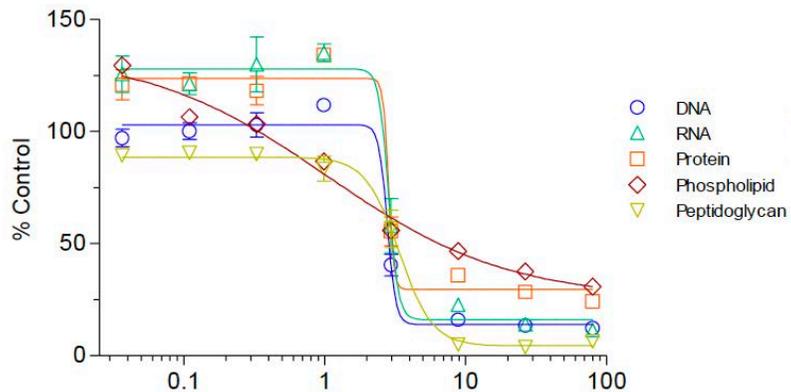
# Unique mechanism of action - bactericidal

Novel mechanism of action now identified with unique ability to rapidly kill bacteria without allowing resistance to develop

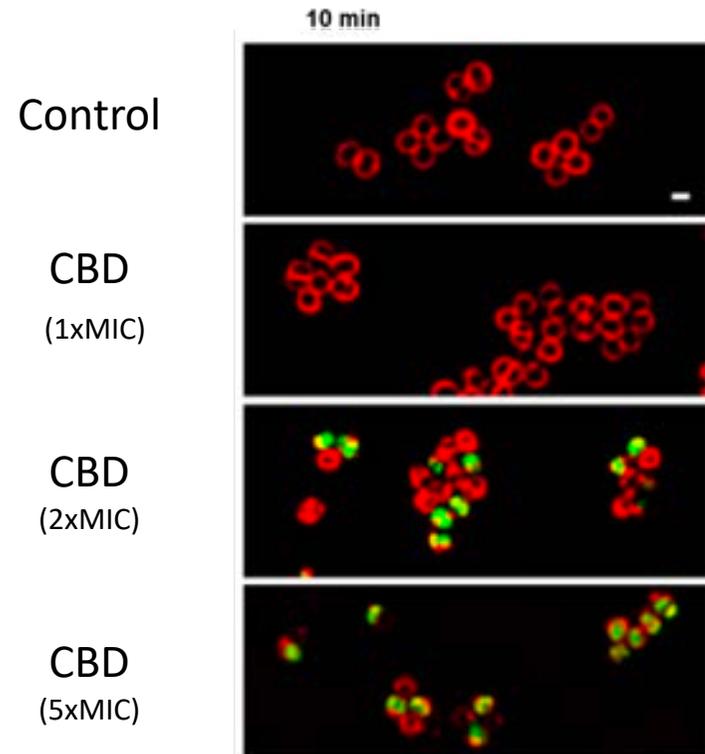
## Mupirocin – targets protein synthesis<sup>1</sup>



## CBD – targets all macromolecular pathways<sup>1</sup>



## CBD – MRSA bacteria dead within 10 minutes<sup>2</sup>

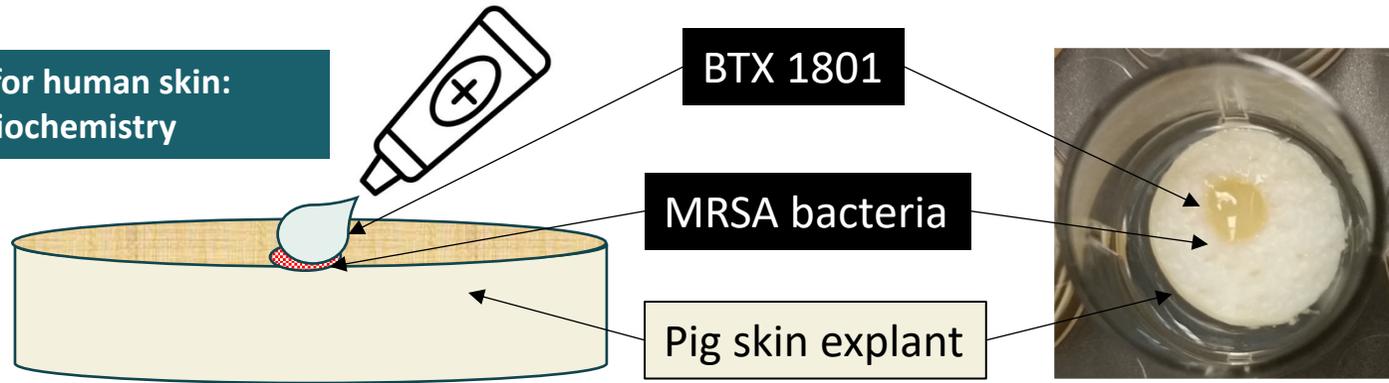


1. Based on testing conducted by HD Biosciences – BOT data on file  
 2. Based on testing conducted by Linnaeus Bioscience – BOT data on file

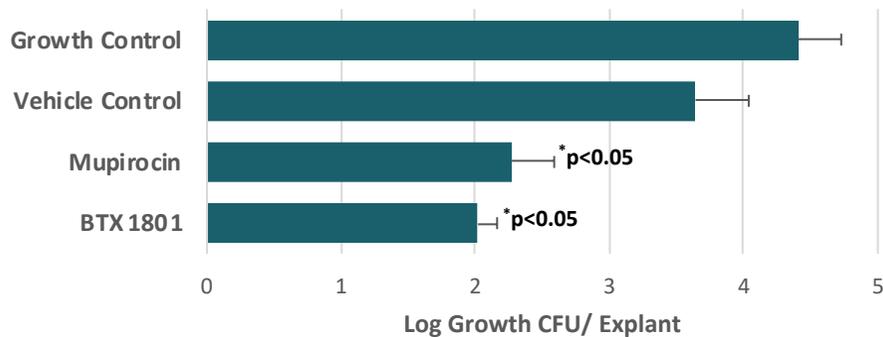
# Ex-vivo porcine skin decolonisation model<sup>1</sup>

BTX 1801 more effective than the current leading topical decolonisation agent mupirocin (*Bactroban*<sup>TM</sup>) at decolonising pig skin of MRSA after 1 or 24 hours of infection

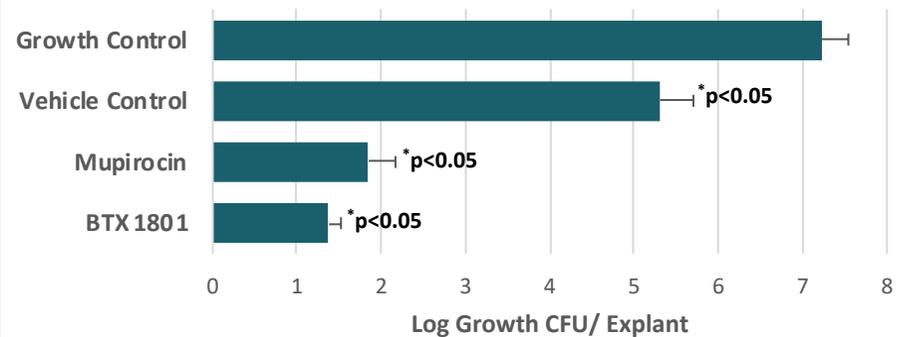
Pig skin is the best model for human skin:  
similar morphology and biochemistry



Decolonisation of MRSA (ATCC 43300) after 1 Hour  
(n=12-15)



Decolonisation of MRSA (ATCC 43300) after 24 Hours  
(n=12-15)



1. Based on testing conducted by Extherid Biosciences – BOT data on file

# Multitude of potential applications

The safety and efficacy profile of synthetic cannabidiol has potential for a multitude of applications across human and animal health



- ✓ **Surgical site infections (nasal decolonisation)**
- ✓ **Skin infections (impetigo and bacterial folliculitis)**
- ✓ **Skin structure infections (diabetic ulcers and wounds)**
- ✓ **Systemic infections (utilising next generation synthetic cannabinoids)**
- ✓ **Ocular infections (utilising next generation synthetic cannabinoids)**



- ✓ **Dermatitis in companion animals (dogs and cats)**
- ✓ **Acral lick granuloma (hot spots in dogs)**
- ✓ **Skin structure infections for companion animals**
- ✓ **Skin infections for livestock animals (cows, pigs, sheep)**
- ✓ **Systemic infections or feed additives for livestock animals**

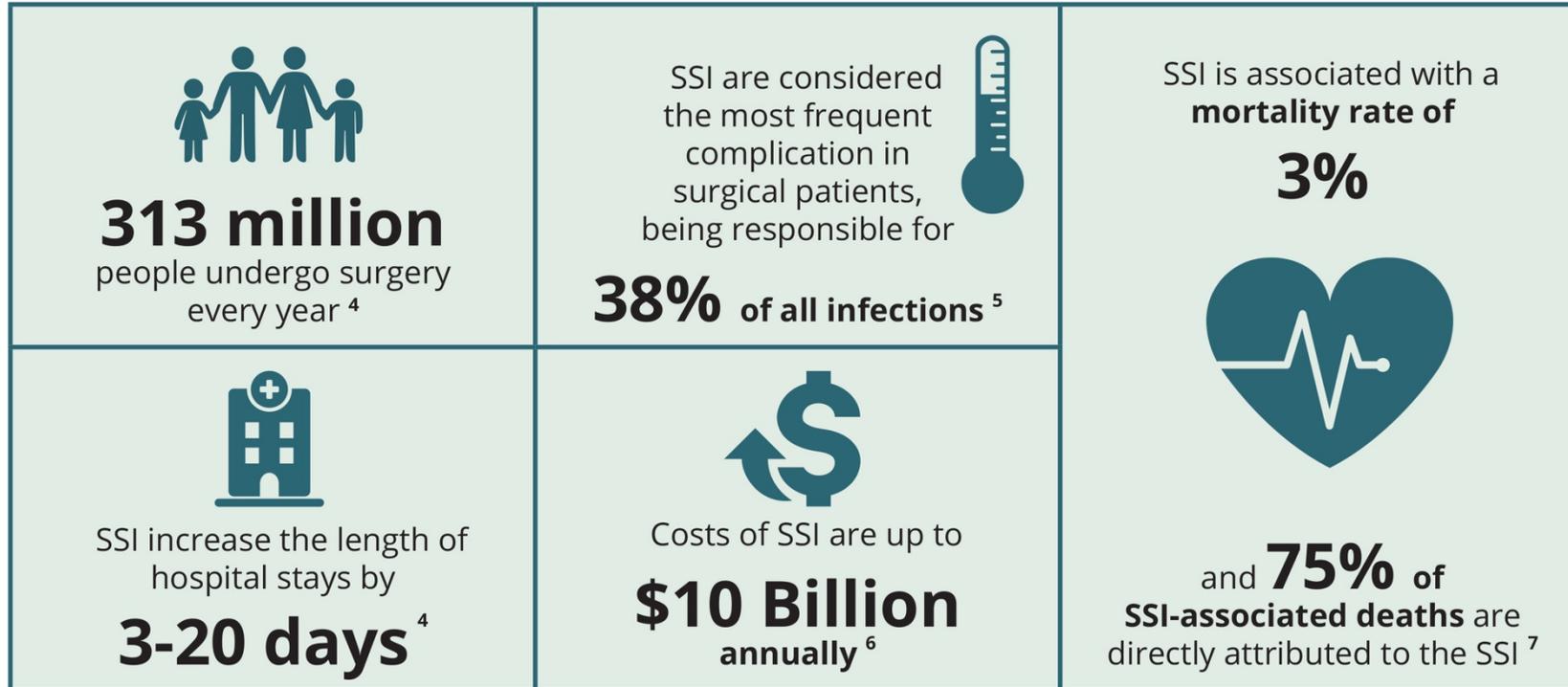


**FIRST TARGET**

**Prevention of surgical site infections**

# Surgical site infections (SSI)

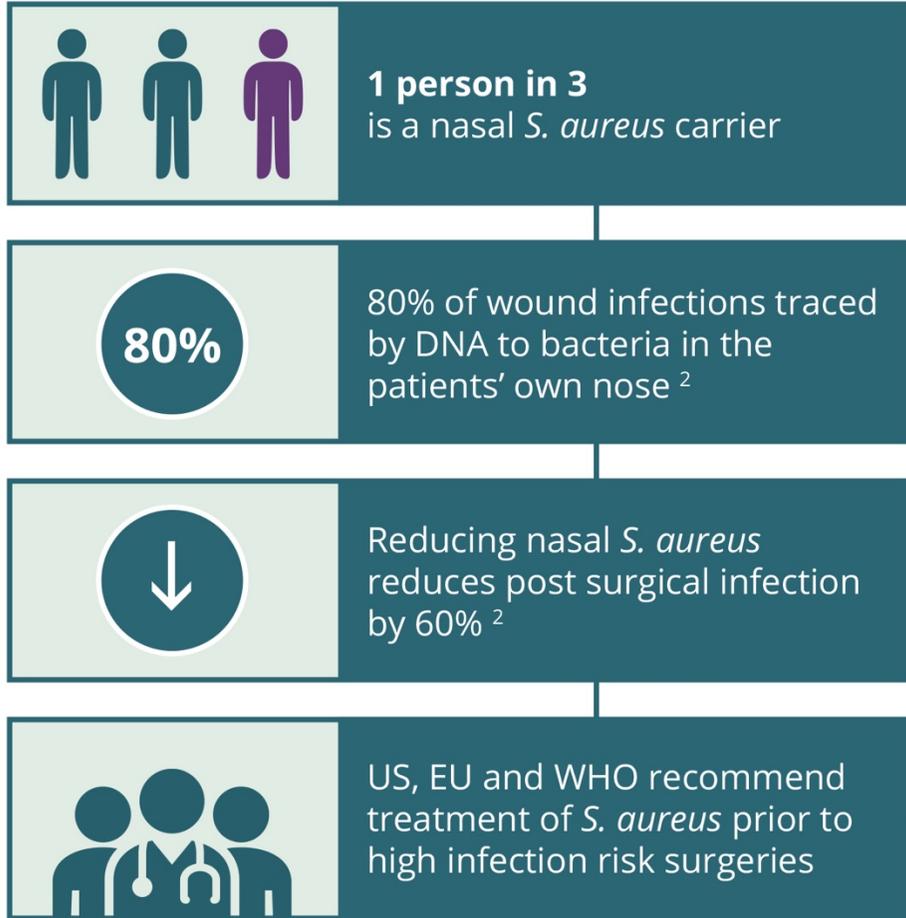
One of the most significant healthcare challenges which impacts patient health and costs the health care system billions of dollars annually<sup>1</sup>



1. WHO Protocol for surgical site infection surveillance with a focus on settings with limited resources, 2018.
2. Rosenthal VD, Richtmann R, Singh S, Apisarnthanarak A, Kübler A, Viet-Hung N et al. Surgical Site Infections, International Nosocomial Infection Control Consortium Report, Data Summary of 30 Countries, 2005–2010. *Infect Control Hosp Epidemiol.* 2013 Jun;34(6):597-604.
3. Umscheid CA, Mitchell MD, Doshi JA, Agarwal R, Williams K, Brennan PJ. *Infect Control Hosp Epidemiol.* Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs. 2011 Feb;32(2):101-14. doi:10.1086/657912.
4. WHO. Hand Hygiene and the Surgical Patient Journey. (accessed Aug. 2016)
5. B. Braun. Surgical Site Infections – Risk Prevention by Surgical Gloving. (accessed Aug. 2016).
6. Centers for Disease Control and Prevention. (CDC). Surgical Site Infection (SSI) Toolkit. (accessed Aug. 2016).
7. Centers for Disease Control and Prevention. (CDC). (accessed Nov. 5, 2015).

# Incidence and current practice in prevention of SSI

High incidence of patients infecting themselves from their own nose is leading to global implementation of nasal decolonisation strategy prior to surgery<sup>1</sup>



- Widespread and prolonged use has led to rapid emergence of *S. aureus* mupirocin resistance
- Resistance rates of up to 95% reported <sup>2</sup>
- Some US hospitals have halted use due to 400% increase in rate of mupirocin resistance

**BUT**

#### **Current US practice:**

1. No treatment, or
2. High risk patient, pre-surgical use of the nasal antibiotic, mupirocin (off label)

1. Hospital Length of Stay and Costs in Patients with Post Operative Wound Infection: Analysis of US National In-Patient Data for 2015 Using ICD-9 and ICD-10 Diagnoses Aggarwal et al (2018) Value in Health Journal Volume 21, Supplement 1, Page 154  
2. Preventing Surgical-Site Infections in Nasal Carriers of Staphylococcus aureus Jan 2010, Bode et al N Engl J Med 2010; 362:9-17

# Clear drivers for adoption of nasal decolonisation

Health treatment guidelines, hospital funding structures and a multitude of risk management strategies are driving adoption of pre-surgical anti-microbial treatment<sup>1</sup>

DRIVERS	STATUS	DRIVERS	STATUS
 <p><b>GUIDELINES</b></p>	Recent guidelines (US, SIS, SHEA, IDSA and WHO) support increased use of preventative approaches, but antibiotic resistance recognised as an issue with mupirocin.	 <p><b>COST EFFECTIVE</b></p>	Economic modelling studies demonstrate preventative approach to <i>S. aureus</i> infection more cost effective than treatment.
 <p><b>HOSPITAL RANKINGS</b></p>	US hospital administrators motivated to reduce infection rates to help push their ranking in published hospital listings.	 <p><b>FINANCIAL PENALTIES</b></p>	US general, acute-care and short-term hospitals with the highest MRSA infections will have 1% of their Medicare reimbursements withheld.
 <p><b>LITIGATION</b></p>	The direct costs of the medical malpractice liability system in the US are widely estimated to be on the order of \$20-\$30 billion per year.	 <p><b>GOVERNMENTS</b></p>	Recent UN General Assembly <sup>2</sup> call for new drugs to tackle antibiotic resistance – recommendations for new incentives to come. On G7 and G20 agendas too.

It is recommended that topical therapy be applied universally”<sup>1</sup>  
- Engelman *et al*, 2019

\$60,000 could be saved in a hospitalised patient through prevention of an individual MRSA SSI case<sup>2</sup>

- Guidelines for Perioperative Care in Cardiac Surgery: Enhanced Recovery After Surgery Society Recommendations Engelman et al, 2019 JAMA Surg. 2019;154(8):755-766. doi:10.1001/jamasurg.2019.1153 Published online May 4, 2019
- UN General Assembly High-Level Meeting on Antimicrobial Resistance in New York City – Fall 2018
- Anderson DJ, Kaye KS, Chen LF, et al. Clinical and financial outcomes due to methicillin resistant Staphylococcus aureus surgical site infection: a multi-center matched outcomes study. PLoS One. 2009; 4(12):e8305. Available online at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0008305>

# US Guidelines for nasal decolonisation increasing in urgency

Multiple guidelines now requiring surgeries to take precautions to decolonize nasal bacteria before most surgeries



## Mupirocin Resistance in *Staphylococcus aureus*: A Systematic Review and Meta-Analysis - Dadashi *et al*, 2019

- Global mupirocin-resistant *S. aureus* prevalence has now increased to 7.6% and that mupirocin-resistant MRSAs have significantly increased to 13.8%.
- The authors conclude that monitoring of mupirocin-resistance development remains critical.



## Guidelines for Perioperative Care in Cardiac Surgery: Enhanced Recovery After Surgery Society Recommendations - Engelman *et al*, 2019

- Article instructs US surgeons to, “Perform topical intranasal decolonization prior to surgery”, with the highest IA recommendation.
- Enhanced Recovery After Surgery recommended that topical therapy be applied universally to all cardiac surgical patients, not only *S. aureus* carriers.



## Decolonization to Reduce Post-discharge Infection Risk among MRSA Carriers - Huang *et al*, 2019

- US government funded >2000 patient study evaluated the benefit of MRSA decolonization for a 6 month period after hospital discharge. Decolonization led to a 44% drop in MRSA infections.
- This study illustrates the potential benefit of longer term, post-hospital discharge, decolonization, representing an additional market indication for BTX 1801.

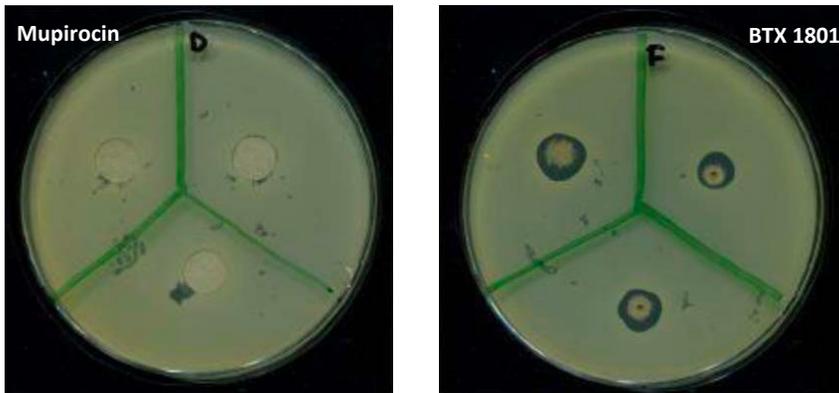
# BTX 1801 active against mupirocin resistant strains of *Staph* (mupRSA)

BTX 1801 displays potent antibacterial activity (MIC and decolonisation of pig skin) against *S. aureus* strains resistant to mupirocin

## Antibiotic Minimum Inhibitory Concentration (MIC) comparison<sup>1</sup>

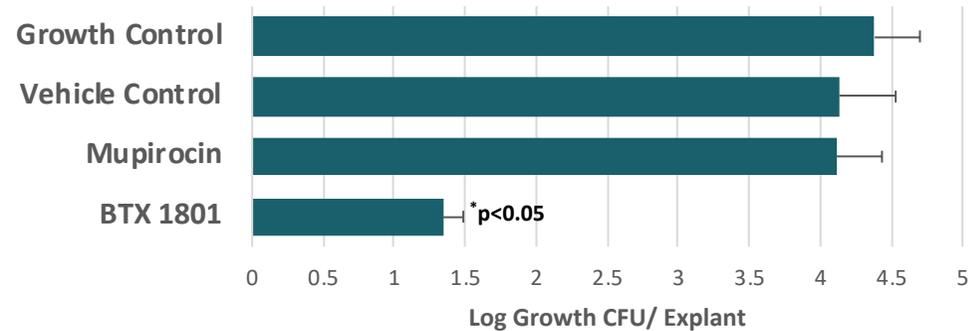
<i>S. aureus</i> Strain	Mupirocin Resistance Level	Cannabidiol MIC Range (µg/mL)	Mupirocin MIC Range (µg/mL)
mupRSA 815	Low level	3.125	16 - 32
mupRSA 329	High Level	3.125	>1,024
mupRSA 993	High Level	1.56 – 3.125	256 – 1,024

## Zone of Inhibition (mupRSA AR218<sup>2</sup>)

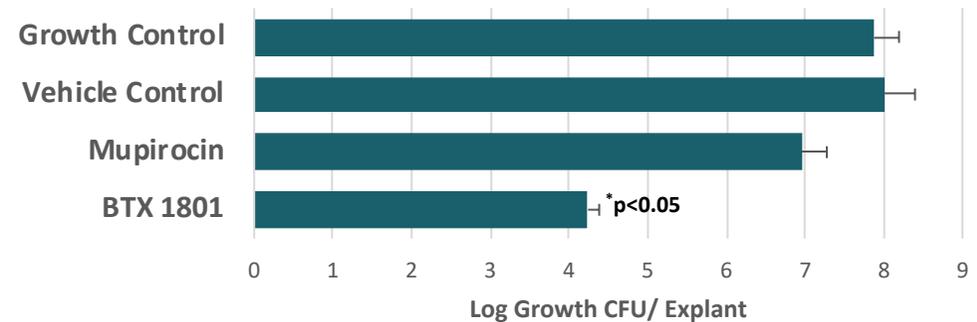


## Ex-vivo Porcine Skin Model comparison<sup>1</sup>

### Decolonisation of mupRSA 993 after 1 Hour



### Decolonisation of mupRSA 993 after 24 Hours



1. Based on testing conducted by Extherid Biosciences – BOT data on file  
 2. Based on testing conducted by iFyber – BOT data on file

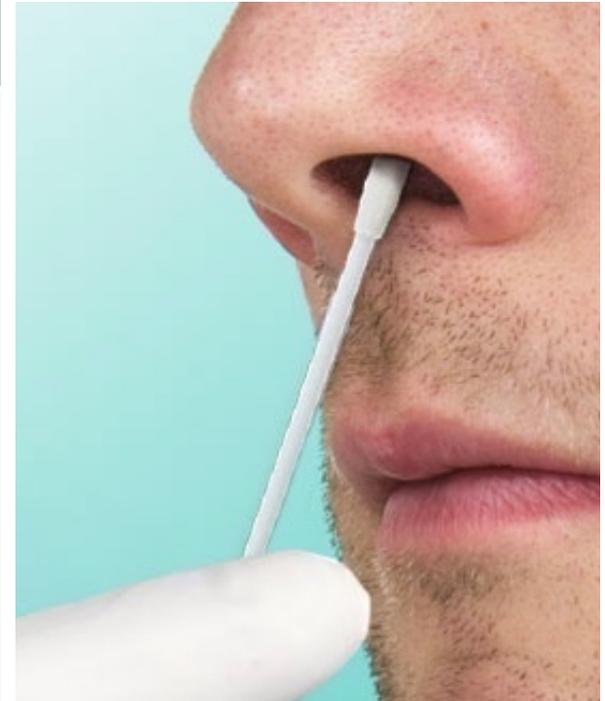


# BTX 1801 Program

# BTX 1801: Phase 2a study design

Double-blind, vehicle-controlled study to evaluate safety, tolerability, and efficacy of two formulations of BTX 1801 applied to the anterior nares of healthy adults colonised with *S. aureus*

Study Design	Endpoints
<ul style="list-style-type: none"><li>• 4 dose groups: ~60 healthy volunteers<ul style="list-style-type: none"><li>- BTX 1801 Formulation A: 20 healthy volunteers</li><li>- BTX 1801 Formulation B: 20 healthy volunteers</li><li>- Vehicle A: 10 healthy volunteers</li><li>- Vehicle B: 10 healthy volunteers</li></ul></li><li>• Single Australian site</li><li>• Adults: 18 years and older with positive nasal <i>S. aureus</i> cultures</li><li>• Twice daily treatment for 5 days</li></ul>	<ul style="list-style-type: none"><li>• <b>Primary endpoint</b><ul style="list-style-type: none"><li>- Safety and local tolerability assessments</li><li>- Proportion of volunteers carrying <i>S. aureus</i> at Day 12</li></ul></li><li>• <b>Secondary endpoints</b><ul style="list-style-type: none"><li>- Proportion of volunteers carrying <i>S. aureus</i> at Days 8 and 28</li><li>- Proportion of volunteers carrying MRSA at Days 8, 12 and 28</li><li>- Nasal recolonisation rates of <i>S. aureus</i> at Days 12 and/or 28</li><li>- PK studies on Formulations A and B</li></ul></li></ul>



Ethics approval received 1Q CY2020

## BTX 1801: Near-term milestones

Key near-term milestones underline the rapid clinical development timelines and regulatory milestones for BTX 1801 providing solid news flow throughout CY2020

Event	Timing
Ethics Approval for Phase 2a Nasal Decolonisation Study	1Q CY2020
Qualified Infectious Disease Product (QIDP) designation	2Q CY 2020
Fast Track Designation with FDA	2Q CY2020
Complete Phase 2a Nasal Decolonisation Study	3Q CY2020
IND Application with FDA	3Q CY2020



# Summary

# Synthetic CBD – broad-spectrum activity with novel mechanism

Consistent effect against a diverse range of Gram-positive bacteria, including multiple strains of the key pathogens *S. aureus*, *MRSA*, *mupRSA*, *C. difficile* and *Cutibacterium (P.) acnes*

Target profile	Synthetic CBD	Antibiotics
 Kills <i>S. aureus</i> and resistant <i>S. aureus</i> (MSRA - “Superbugs”) <sup>1</sup>	✓	✗
 Shows broad-spectrum Gram-Positive activity <sup>2</sup>	✓	✗
 MRSA bacteria do not develop resistance <sup>1</sup>	✓	✗
 Disrupts bacterial biofilms <sup>3</sup>	✓	✗
 Potential for widespread use across human and animal health <sup>2</sup>	✓	✗
 Broad anti-inflammatory properties relevant to infections <sup>4</sup>	✓	✗

1. See references on Slide 12

2. See references on Slide 11

3. Based on testing conducted by the University of Queensland – BOT data on file

4. Based on BTX 1503 Phase 1b clinical data on inflammation – BOT data on file