

Honey

vs

Superbugs

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Healing history of honey



Bee symbol was used to represent the Pharaohs

Egyptians were the first beekeepers



Antimicrobial activity of honey

Low water activity

~ 80% sugars

Hydrogen peroxide

glucose oxidase + H₂O

Low pH

gluconic acid

pH ~ 3.2 - 4.5

Floral factors

Leptospermum honey



Conditions traditionally treated with honey

Gastroenteritis

Throat infections

Influenza

Schistosomiasis

Asthma

Diphtheria

Contraception

Wound infections

Insect bites

Burns

Ulcers

Eye infections

Abscesses

Syphilis

Honey was used medicinally until
~1940s...



Antibiotics largely replaced the medicinal use of honey

1940s: antibiotics enthusiastically adopted by modern medicine - saved millions of lives

However, antibiotics were (and still are) one of the most *over prescribed* classes of drugs

They are also used extensively (*and incorrectly*) in animal feed



Antibiotics... don't pack the same punch they once did

The overuse of antibiotics has led to the emergence of drug resistant microorganisms – some of the most dangerous **SUPERBUGS**

Today, almost all important pathogens have at least some level of **antibiotic resistance**



What are superbugs?

Superbugs are:

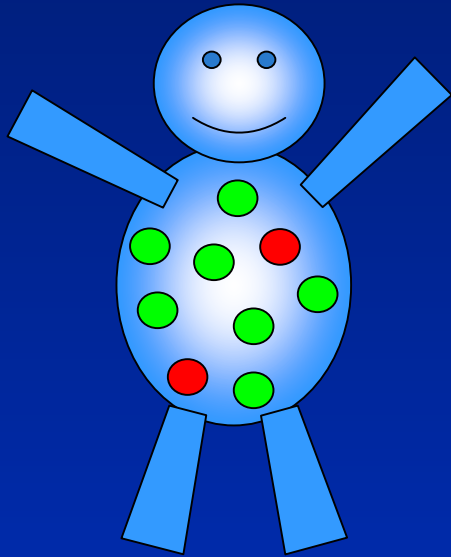
Microbes that have evolved to have **multi drug resistance** (probably from over use of antibiotics)

Pathogens that are inherently resistant to modern antibiotics and/or difficult to treat
- **Fungal pathogens**

Microbes living in consortia or **biofilms**

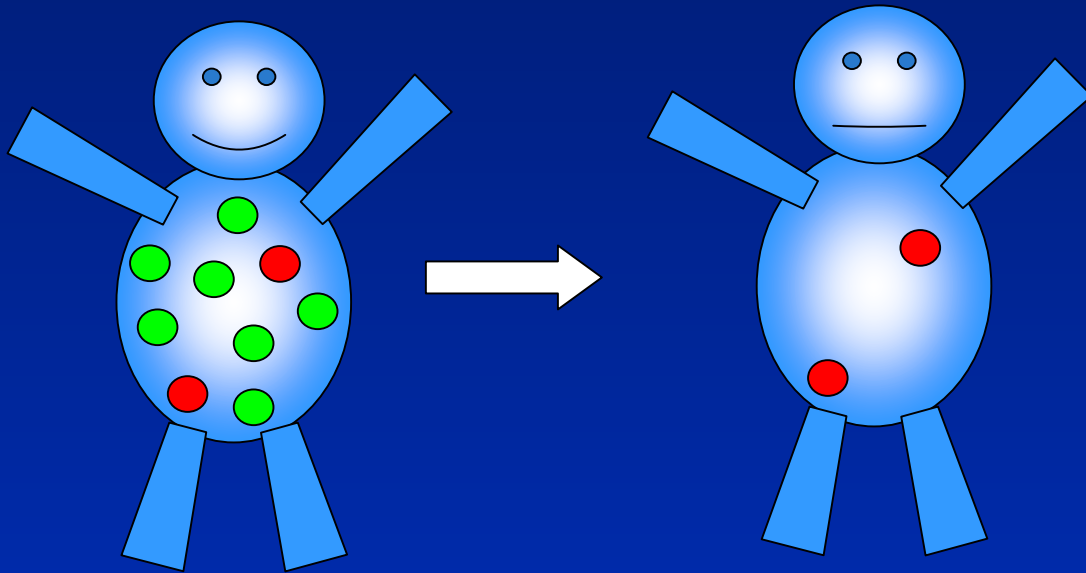


Where do superbugs come from?



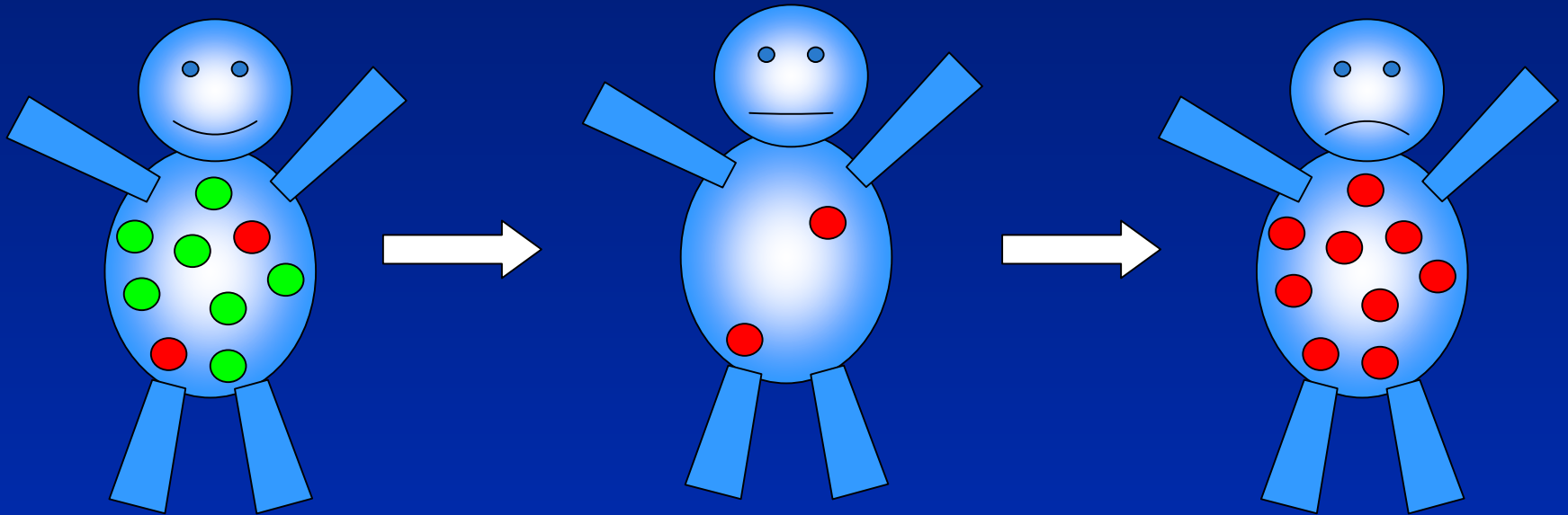
Every time you use antibiotics you select for resistant bacteria

Where do superbugs come from?



Every time you use antibiotics you select for resistant bacteria

Where do superbugs come from?



Every time you use antibiotics you select for resistant bacteria

eg Golden Staph

Superbugs...



Very difficult to treat with conventional medicine - sometimes impossible

Could antimicrobial honey be a sweet solution against some of these bugs?



Honey kills drug resistant pathogens

Gram positive

Staphylococcus aureus

MRSA (Golden Staph)

Propionibacterium

Streptococcus

Enterococcus

VRE



Gram negative

Pseudomonas

Proteus

Enterobacter

Escherichia

Klebsiella

Acinetobacter

Citrobacter

Morganella

Serratia

Pasteurella

Yersinia

Honey vs methicillin-resistant *Staphylococcus aureus*

Methicillin-resistant *Staphylococcus aureus*
- MRSA or “golden Staph”

Huge global problem

20 clinical isolates of MRSA

MIC honey: 4%

MIC artificial honey: > 25%



Honey vs multi-drug resistant wound infecting pathogens

94 clinical isolates of Gram-negative bacteria - many from the “top 3” families of problematic hospital pathogens

MIC honey: 7 – 15%

MIC artificial honey: >20%



Honey vs *Candida*



Thrush caused by the yeast *Candida*

Wound infections – immunocompromised

Eukaryotic cells

Drug resistance



Honey vs *Candida*

38 clinical isolates

Sensitivity to honey depends on

- species of *Candida*
- type of honey

Honey with hydrogen peroxide activity is more effective than other types



Honey vs Dermatophytes



Control

Tinea - most common fungal infection in the general population



10% honey

Caused by dermatophytes



15% honey

Problematic for the immunocompromised patient

MIC honey: 10 - 20%

MIC artificial honey: >30%

Propionibacterium acnes

Major role in pathogenesis of acne

Affects 85% of teenagers, 11% of adults

Antibiotic resistance

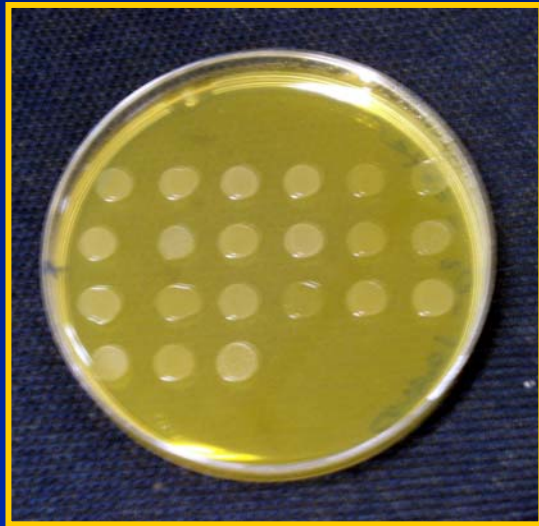
Adverse drug effects

**Honey has not been tested
against medically important
anaerobes**

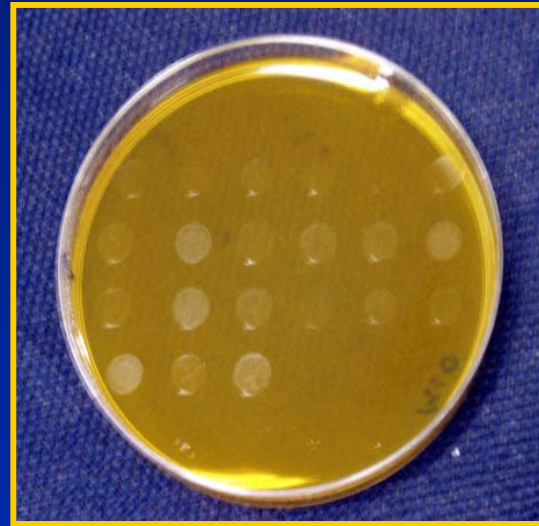


Honey vs *Propionibacterium acnes*

Control plate



Honey plate



MIC honey: 9-14%

MIC artificial honey: > 30%

Honey vs 'Flesh eating' bacteria

Honey treatment of Fournier's gangrene

Honey: controlled infection
faster healing
no fatalities

Conventional treatment:

increased need for surgery
fatalities



Honey cures superbug infection

88 year old woman

Extensive leg ulcers for more than 50 years

Recurrent Golden Staph infections



Week 5 of honey dressings



Week 10 of honey dressings



Honey is grossly underutilised in modern medicine

Antibiotic resistance - *largest problem facing modern medicine*

Honey is incredibly broad spectrum

- Gram-positive and Gram-negative**
- Multi drug resistant pathogens**
- Fungal pathogens**
- Biofilms**



Conclusions

Honey should be seriously considered as a wound dressing

Broad spectrum
antimicrobial agent
-drug resistant microbes

Particularly effective for
burns, ulcers and
infected wounds

Ideal dressing properties

No reported side effects

Stimulates healing

Very cost effective

Excellent prophylaxis

Honey type is important

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Medihoney

Comvita

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