NUI Galway
OÉ Gaillimh

Cell EXPLORERS

Battling Bacteria:

John Doe's Antibiotic Story

SFI Discover
Fondúireacht Eolaíochta Éireann
Science Foundation Ireland

CC BY NC SA

What keeps us healthy?

What makes us SICK?

BAD
MICROORGANISMS

Chapter 1: Say hello to John Doe

Chapter 2: Going to see the Doctor

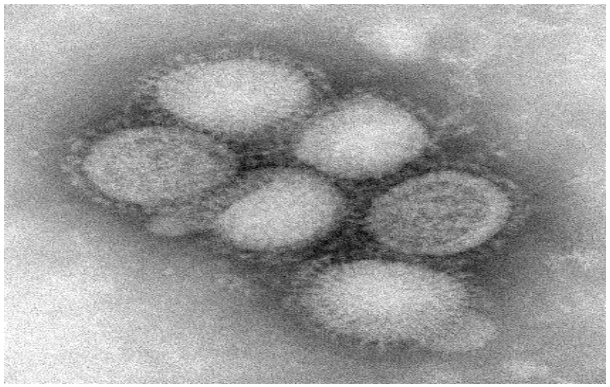
ANTIBIOTICS

Chapter 3: Penicillin and the Cell Wall

What are antibiotics?

➡ **ANTIBIOTICS**

Streptococcus Pyogenes **= Bacteria**

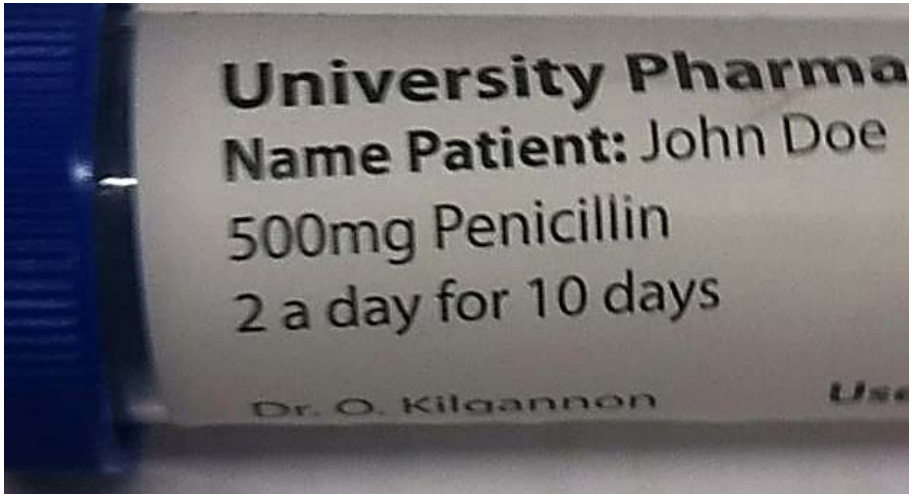


➡ **NO ANTIBIOTICS**

WHY??

Influenza **= Virus**

Penicillin

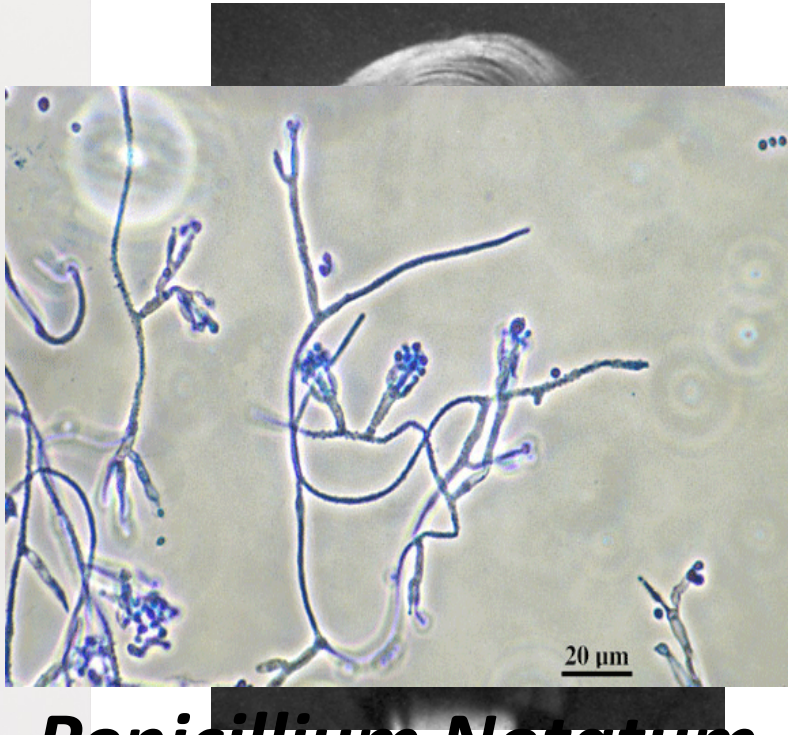


2 Tablets /Day

10 Days

BACTERIA

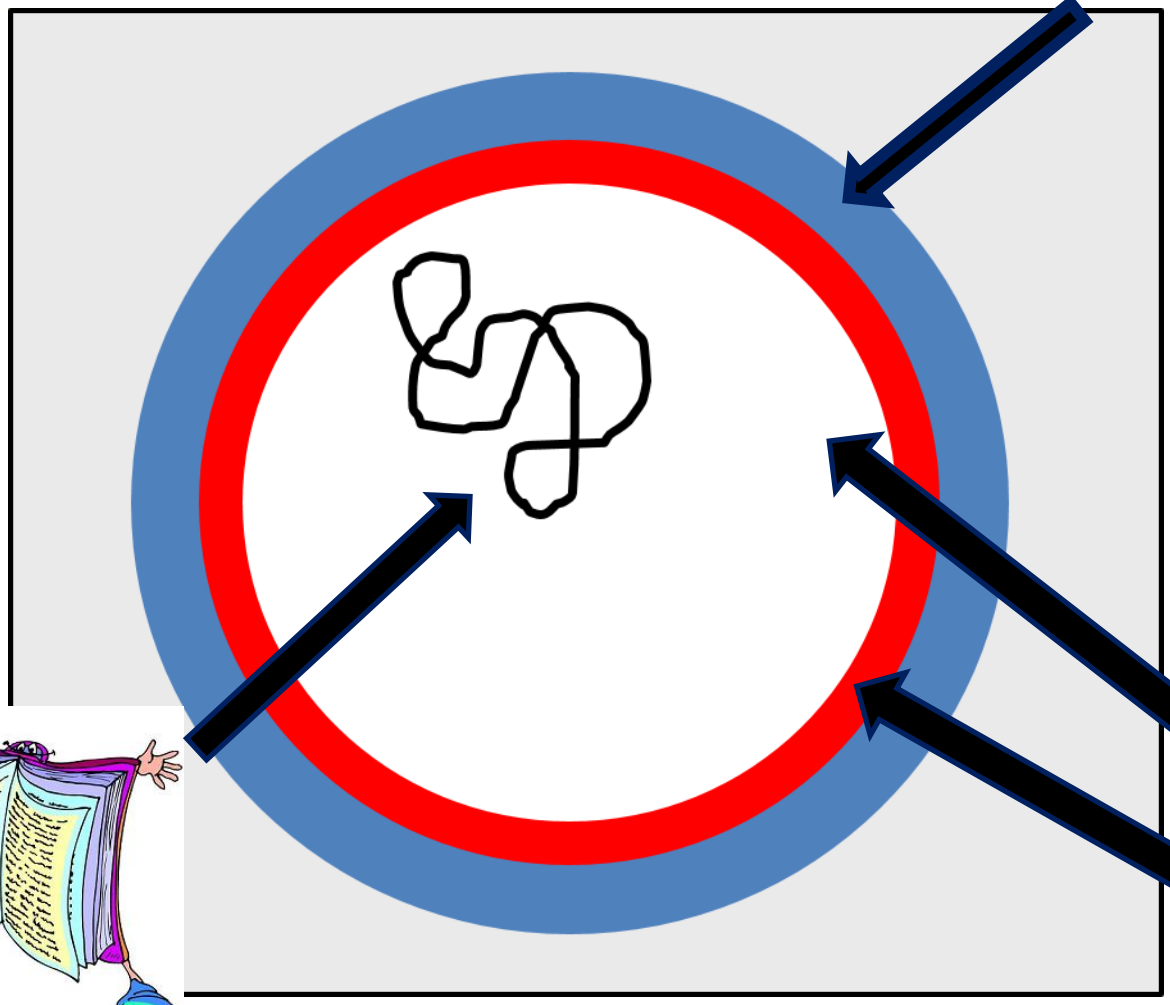
Who discovered Penicillin?



Penicillium Notatum

PENICILLIN

CELL WALL

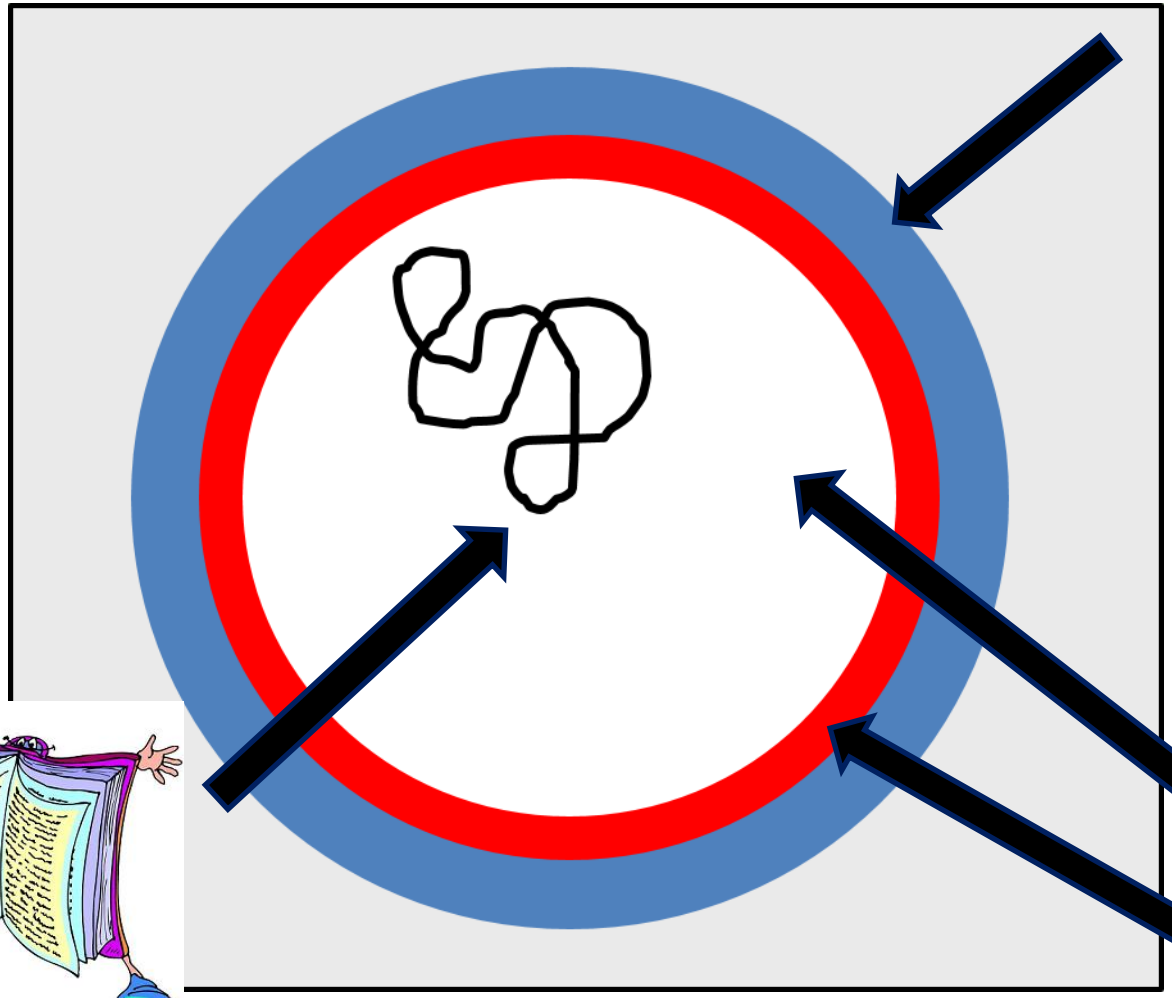


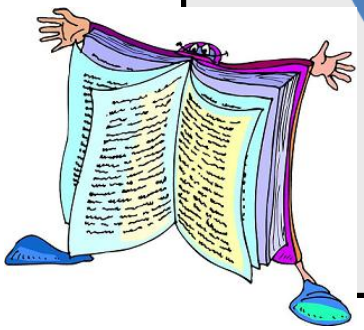
CYTOPLASM

CELL MEMBRANE

WHAT DOES A BACTERIA CELL LOOK LIKE?

CELL WALL





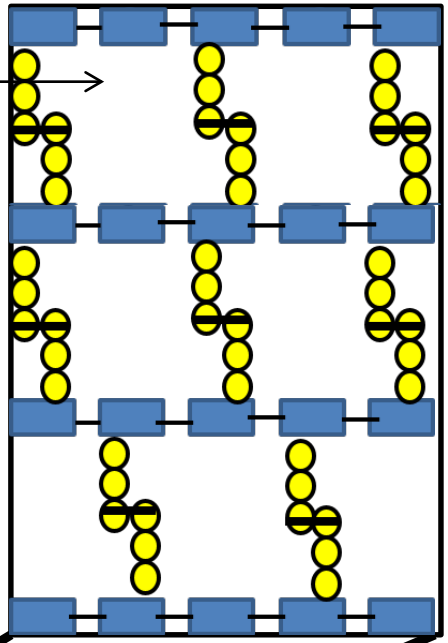
CYTOPLASM

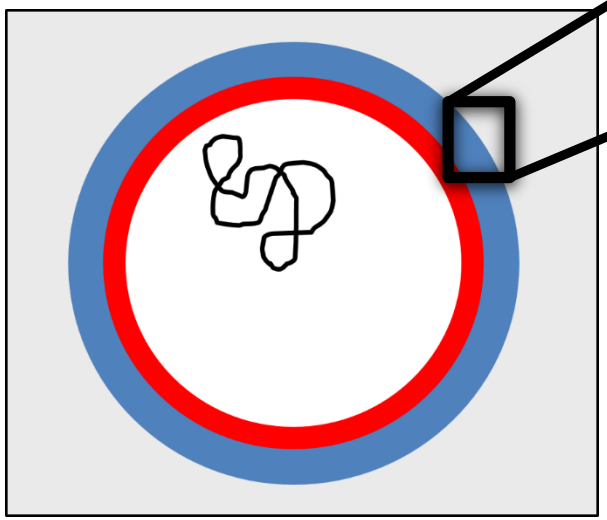
CELL MEMBRANE

WHICH STRUCTURE DOES PENICILLIN ATTACK?

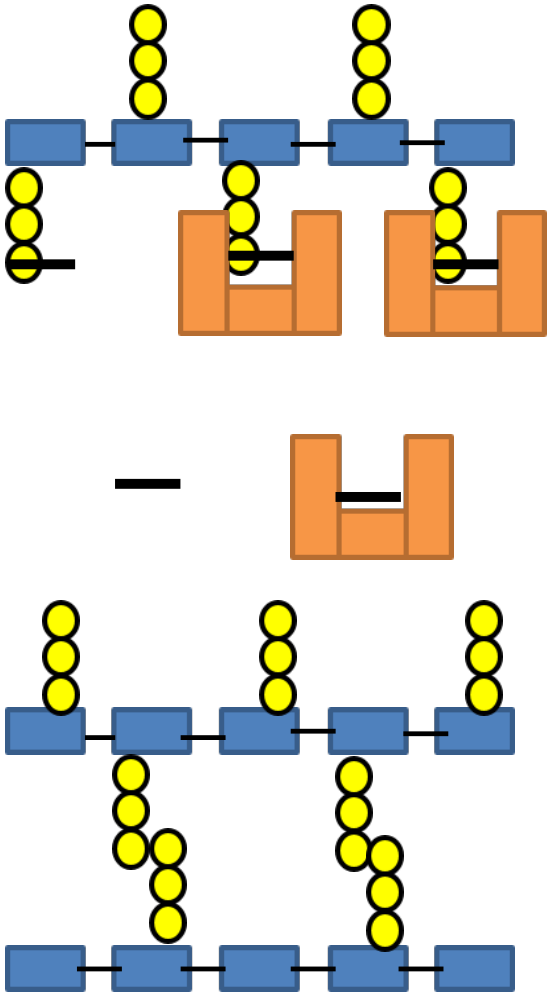
AMINO ACIDS

SUGARS

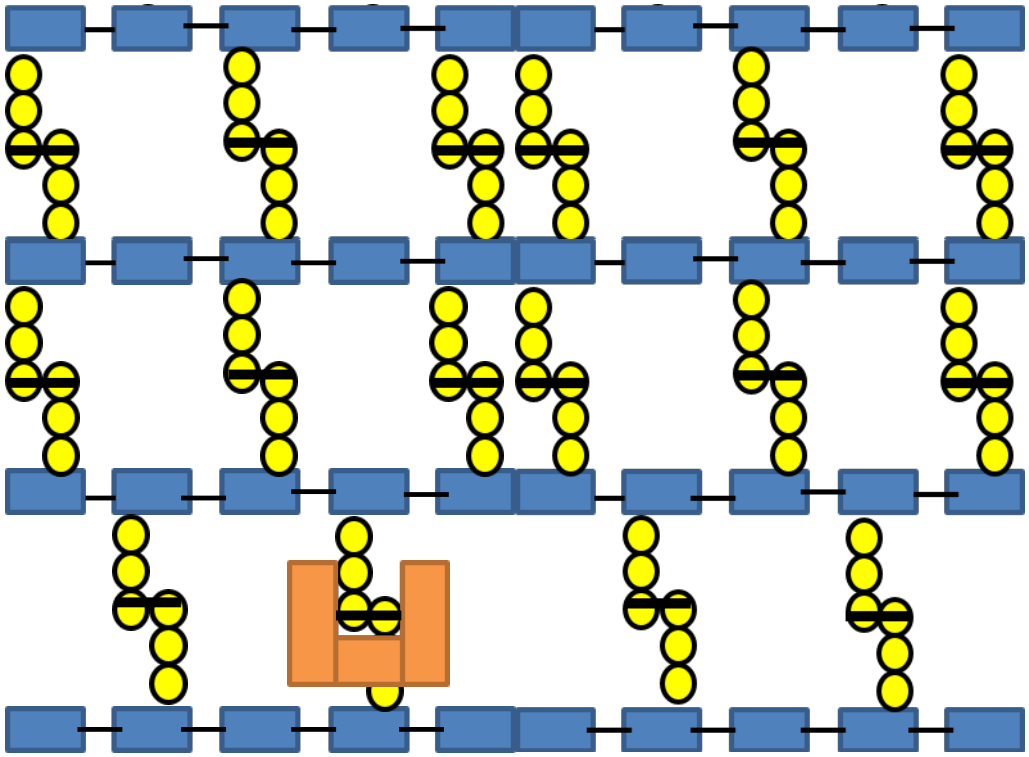




LET'S TAKE A CLOSER LOOK



HOW DO BACTERIA MAKE THEIR CELL WALL?



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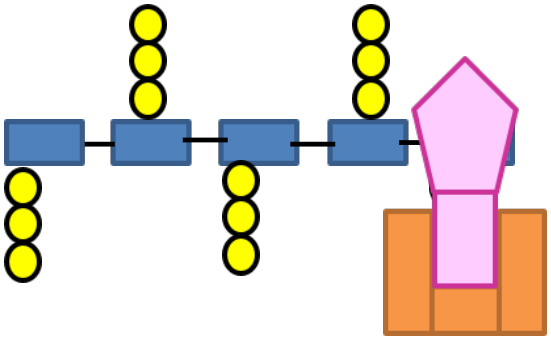
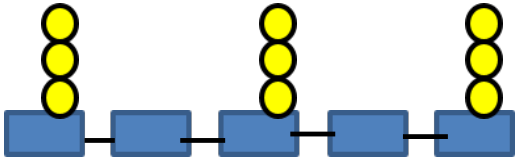
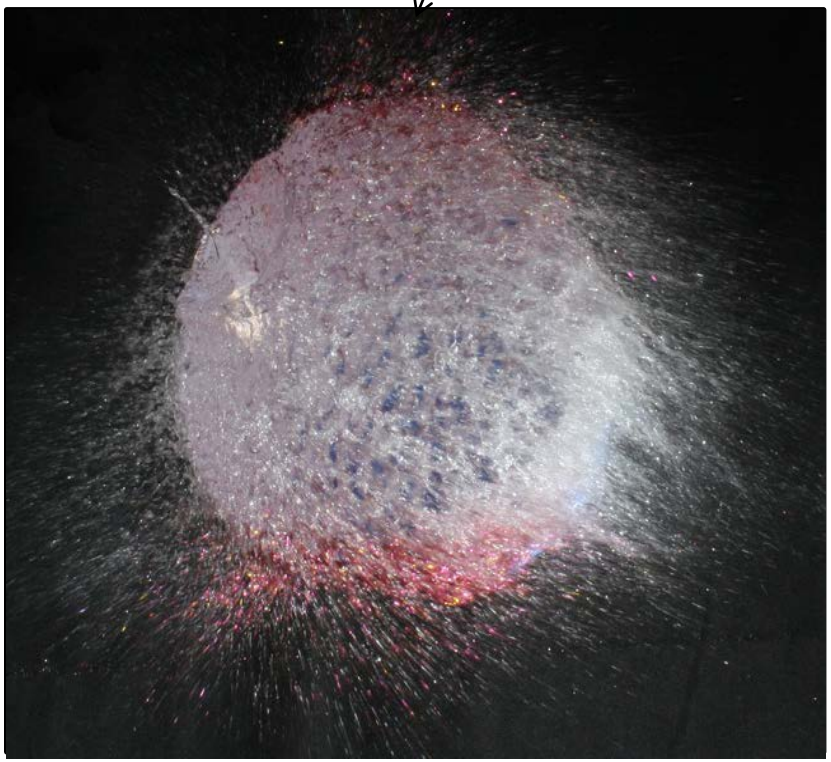
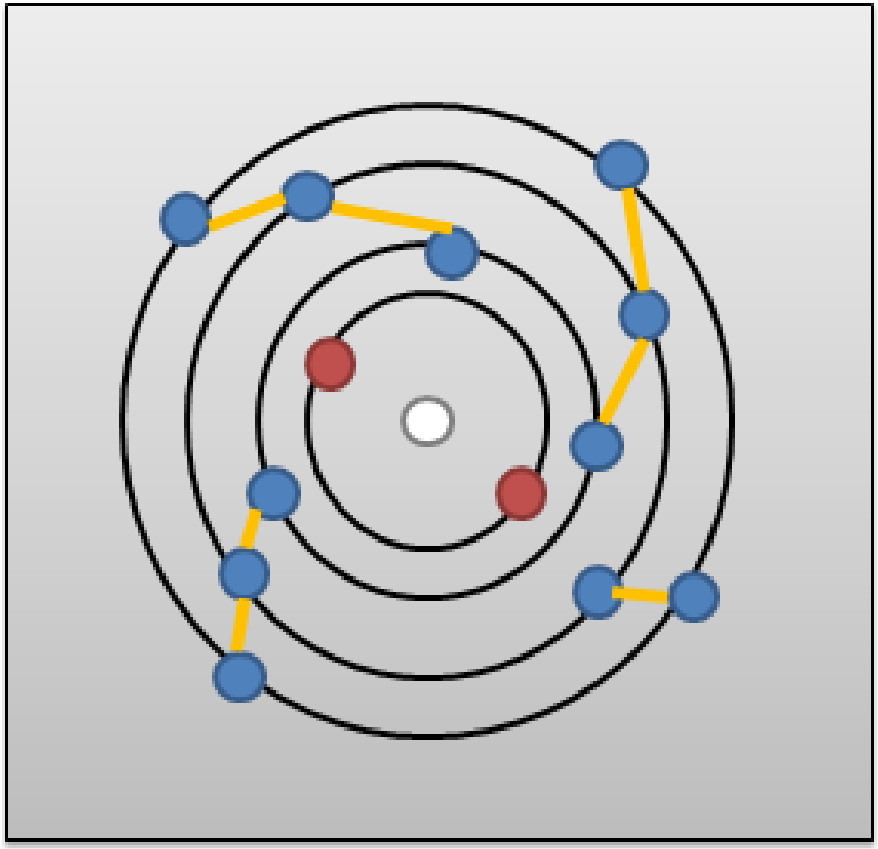


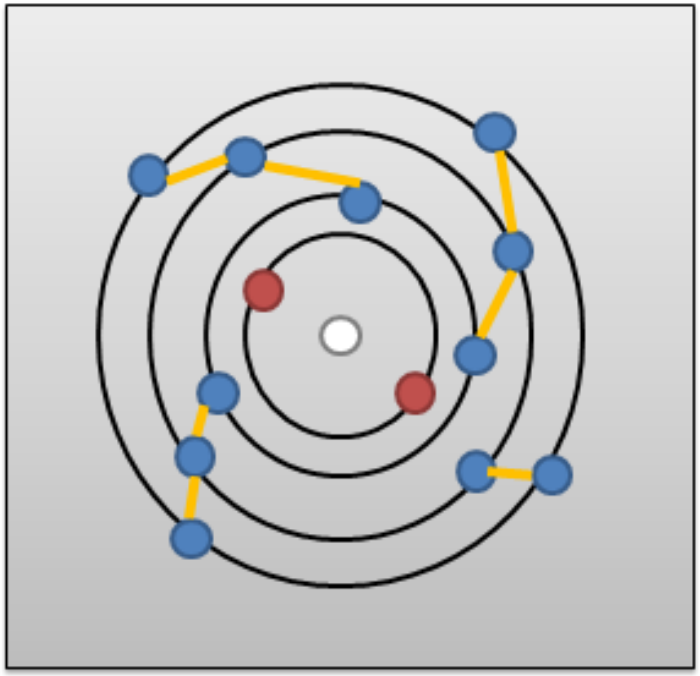


PENICILLIN



HOW DOES PENICILLIN KILL BACTERIA?



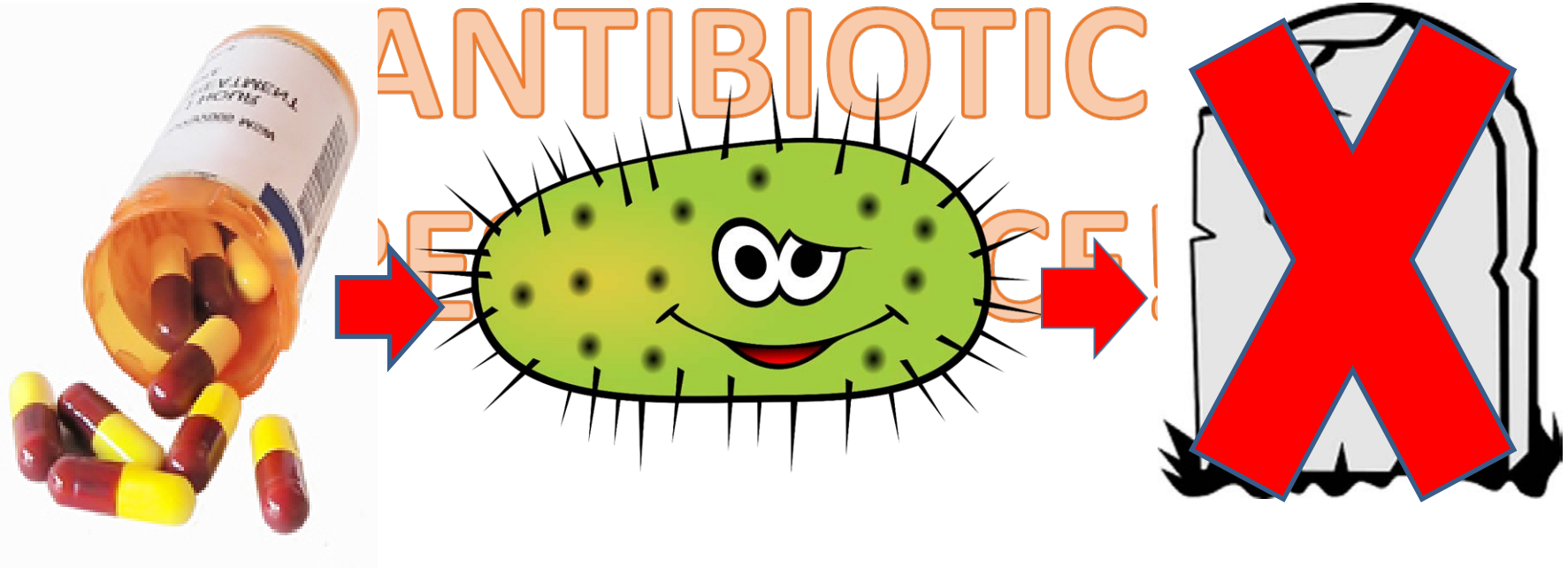


	Cell Wall Sugar
	Cell Membrane
	Cytoplasm
	Rope
	Amino Acids

cc BY NC SA

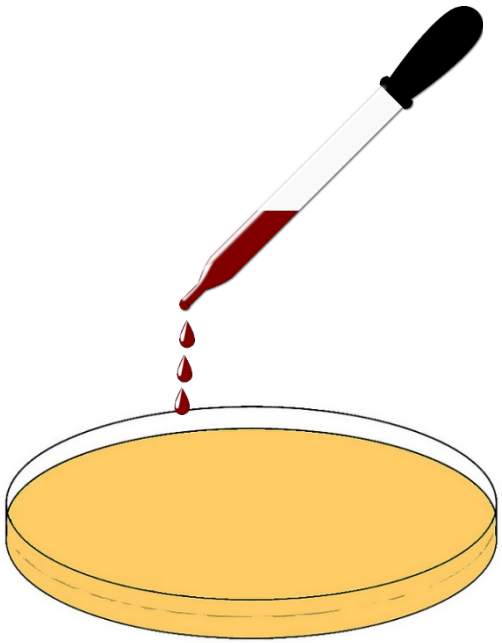
Chapter 5
Antibiotic resistance

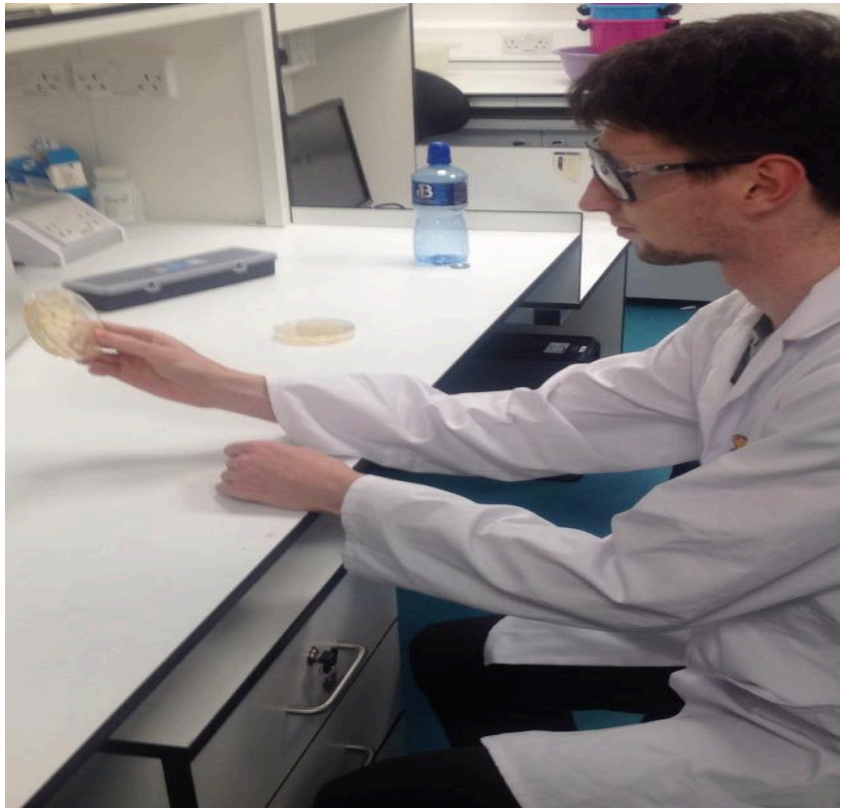
This is known as

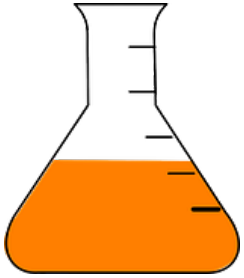


Could antibiotic resistance be dangerous to your health?

Today you will work like microbiologists



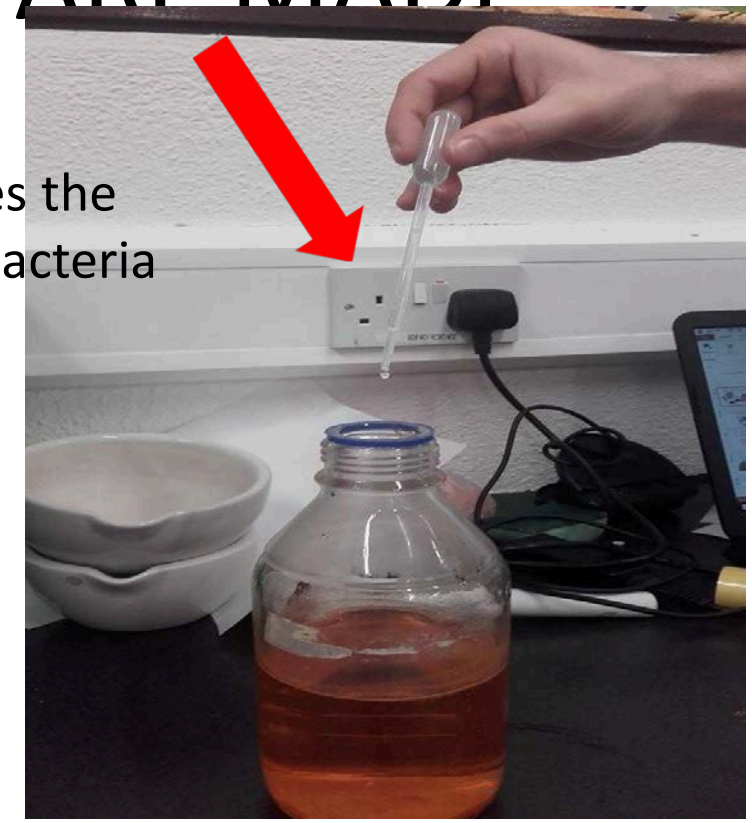




HOW PLATES ARE MADE

AGAR- Provides the nutrients for bacteria to grow

ANTIBIOTIC IS ADDED TO THE AGAR



The hot liquid is the poured into petri dishes

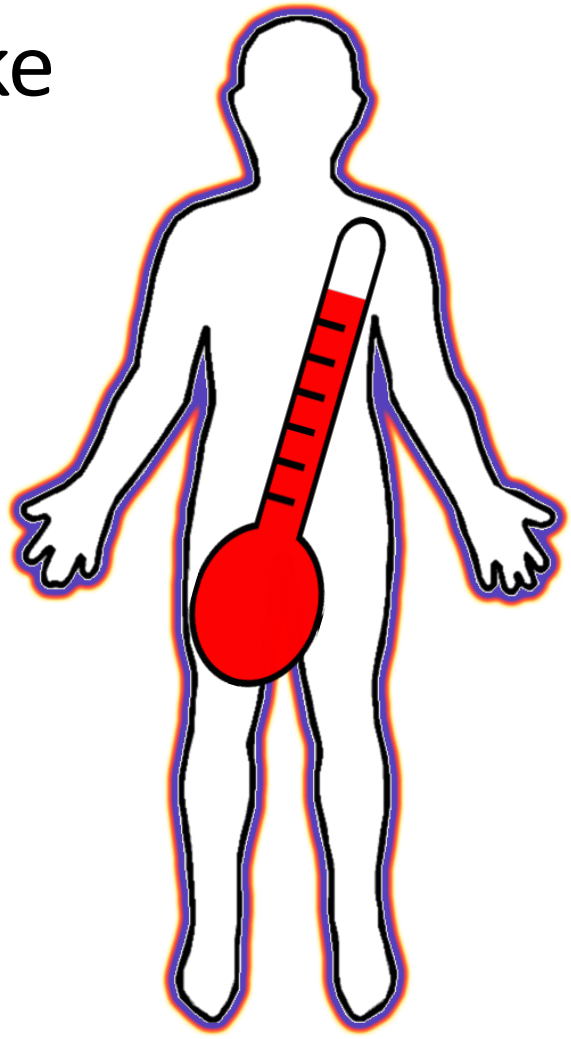
GEL= AGAR + ANTIBIOTIC

Bacteria are spread on the plate with the swab

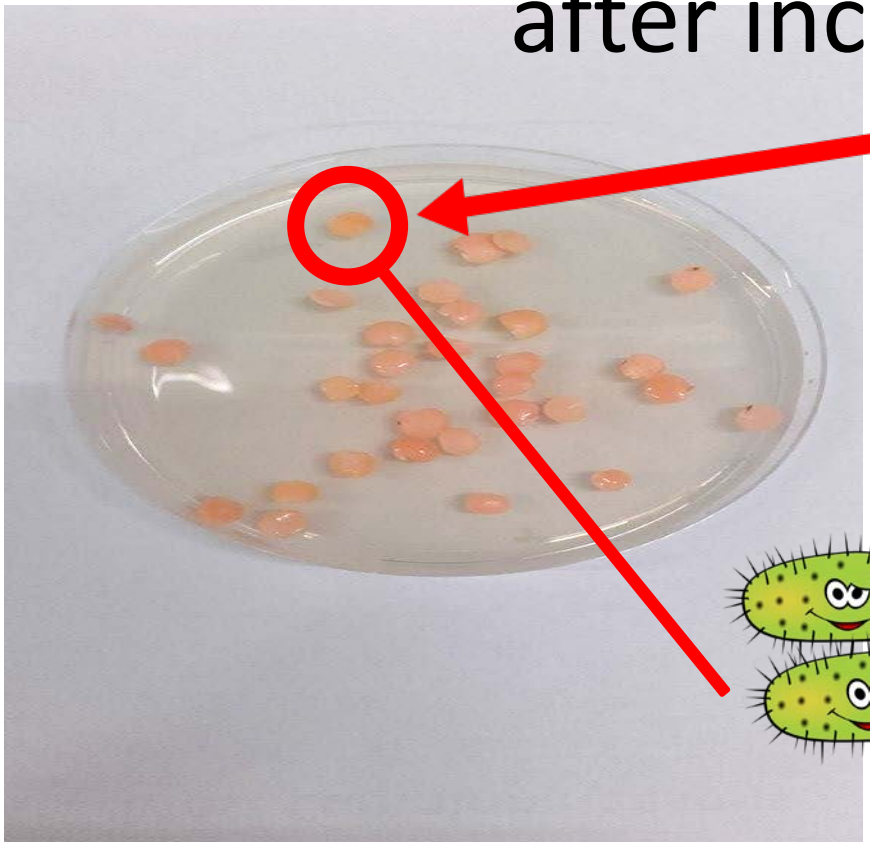
Plates are then placed in an incubator for 48 hours

What an Incubator looks like

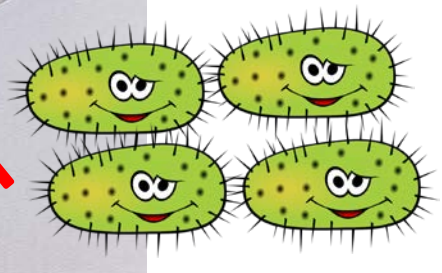
37*C



What do bacteria look like on a plate after incubation?



Colony of bacteria



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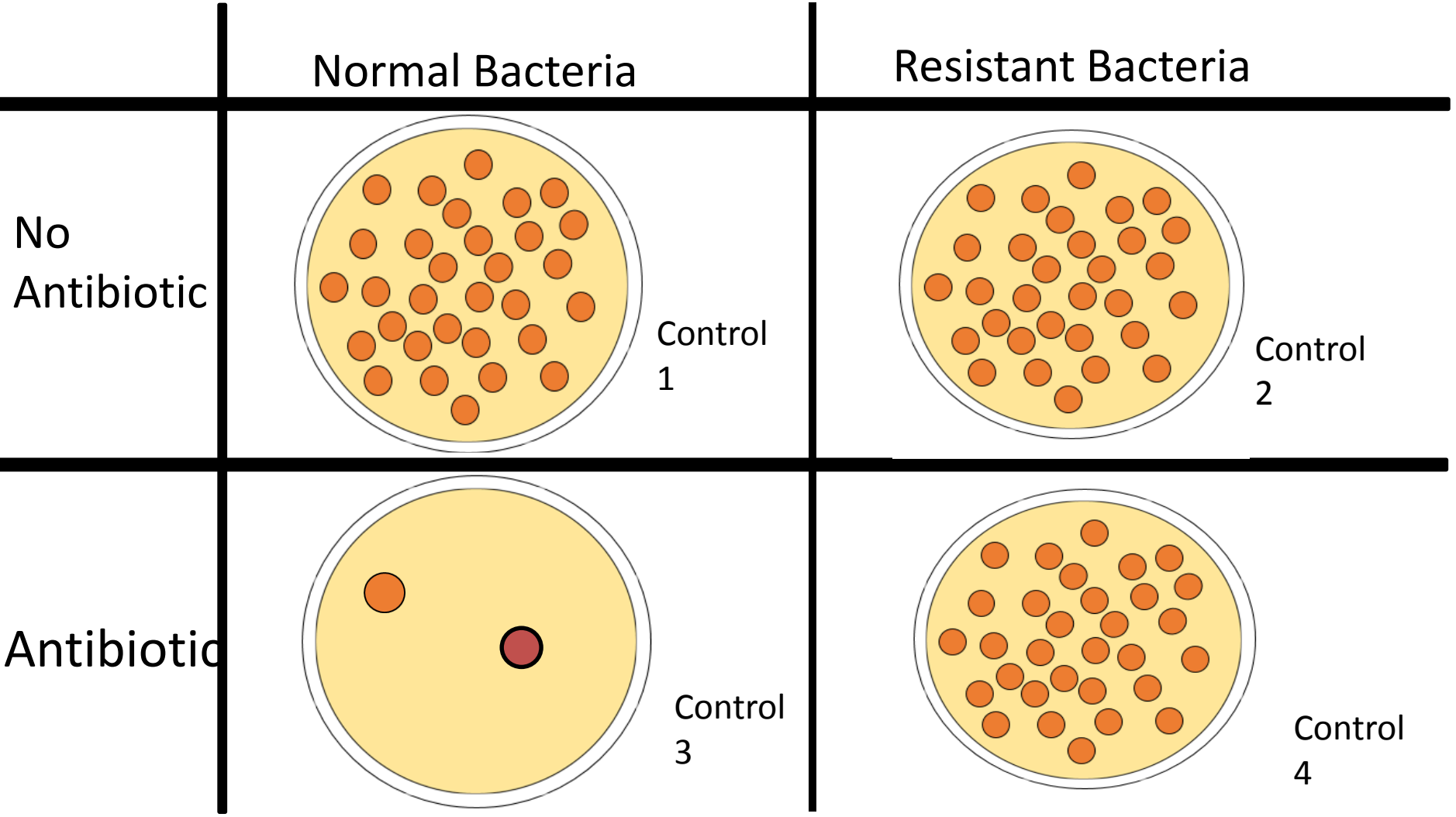
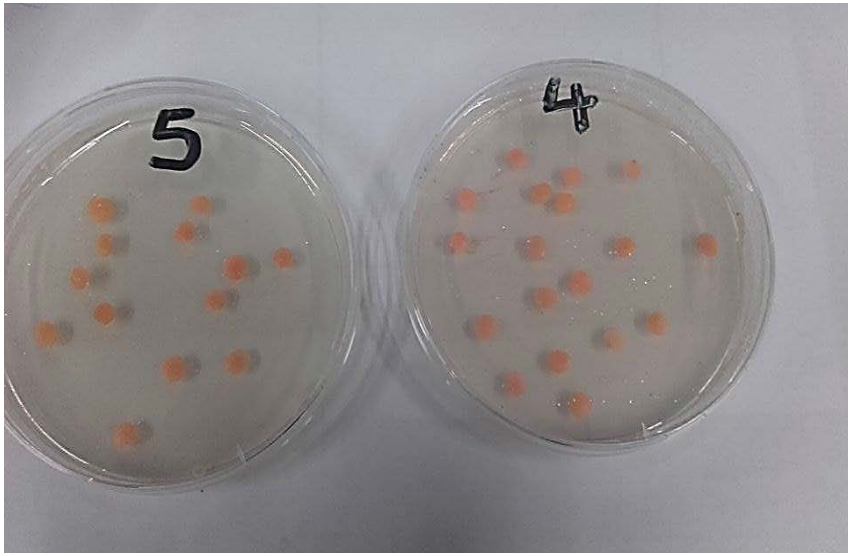

Normal Bacteria
Resistant Bacteria
No Antibiotic
Antibiotic
Control 1
Control 2
Control 3
Control 4

Today you will examine patients plates to see if their bacteria are resistant to penicillin



Your job as my team

More than 10 colonies **the bacteria are** **resistant to the antibiotic**

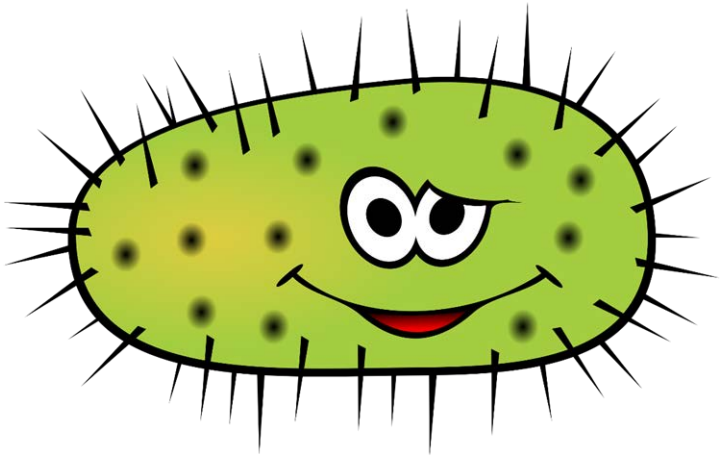
Less than 10 colonies **the antibiotic works** **against the bacteria**

How does antibiotic resistance happen?

Who becomes resistant to the antibiotic?

The patient

OR



The patient's bacteria?

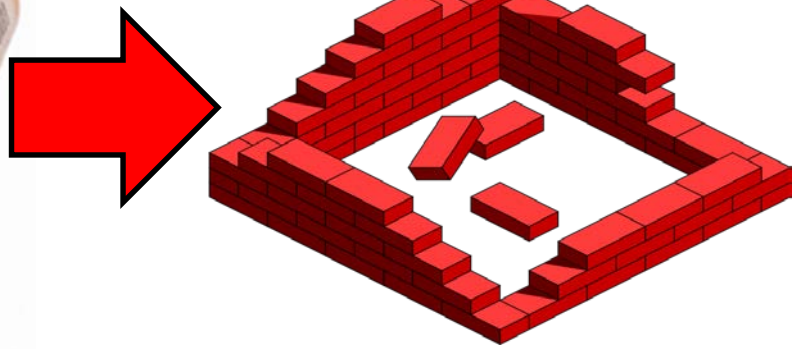
From counting the plates which plates do you think could be John Doe's

JOHN'S BACTERIA ARE RESISTANT TO PENICILLIN

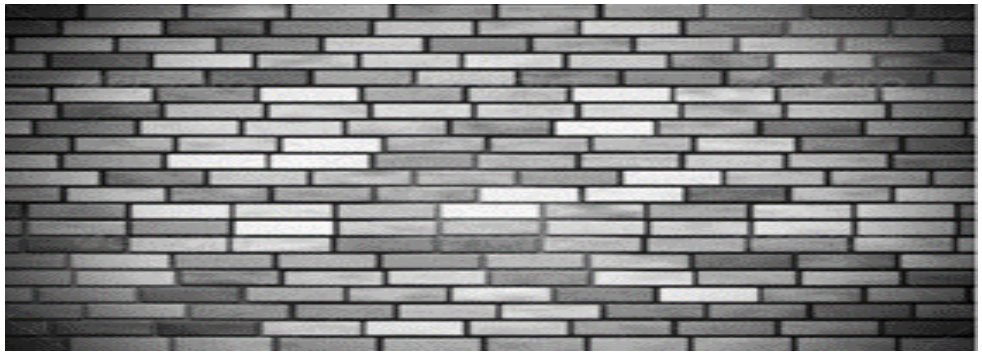
A Reminder

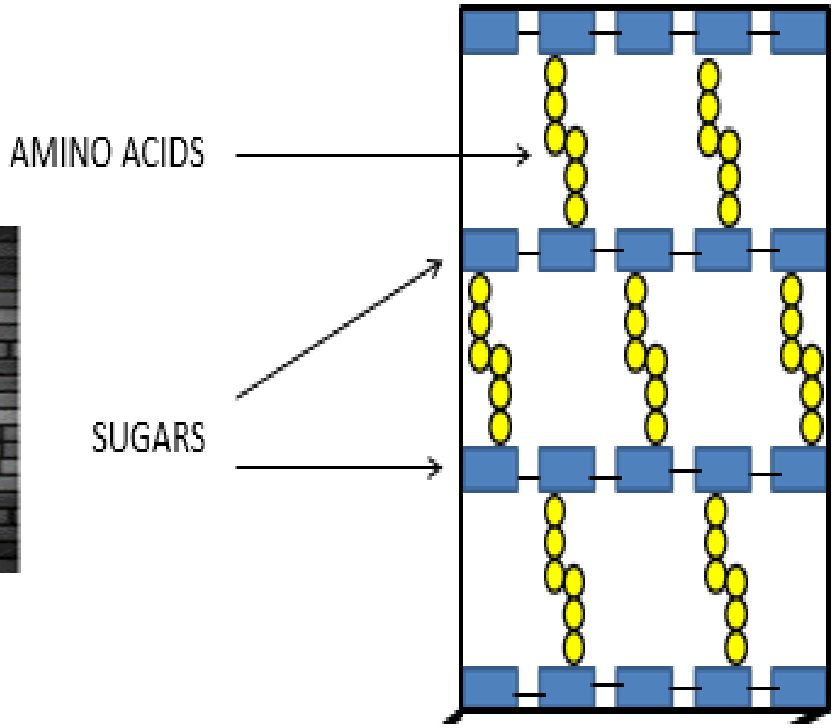
What part of Bacteria do some

(cs like target?

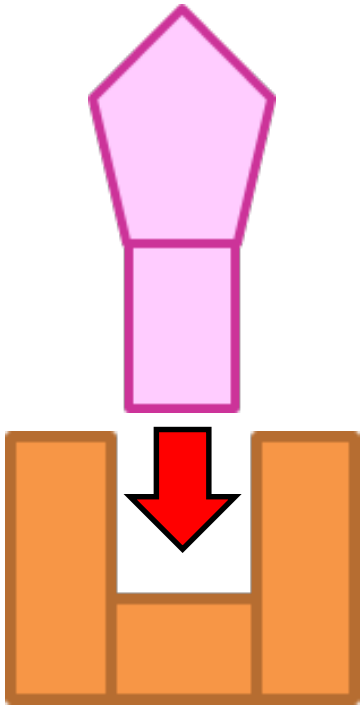


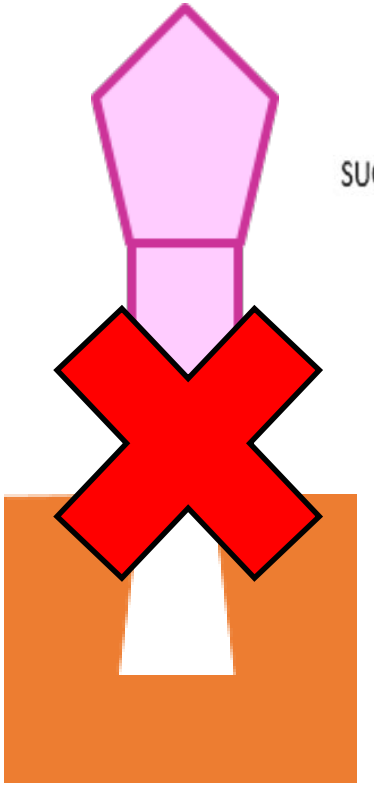
So for bacteria to become resistant to penicillin what do you think they must c

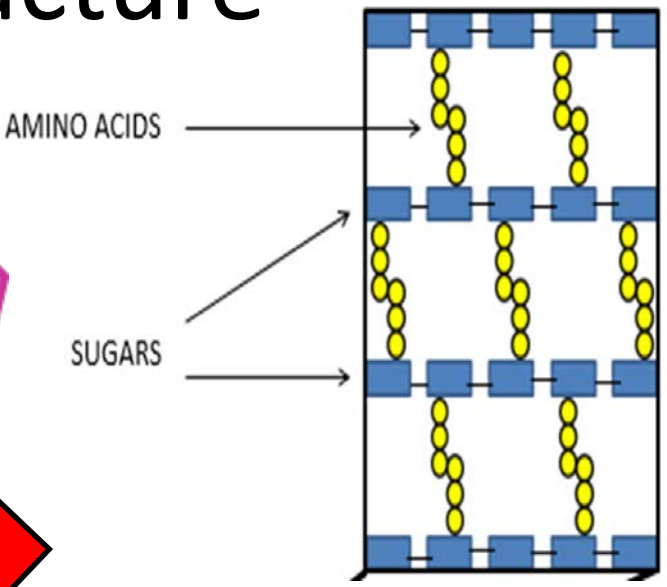




Changes in structure

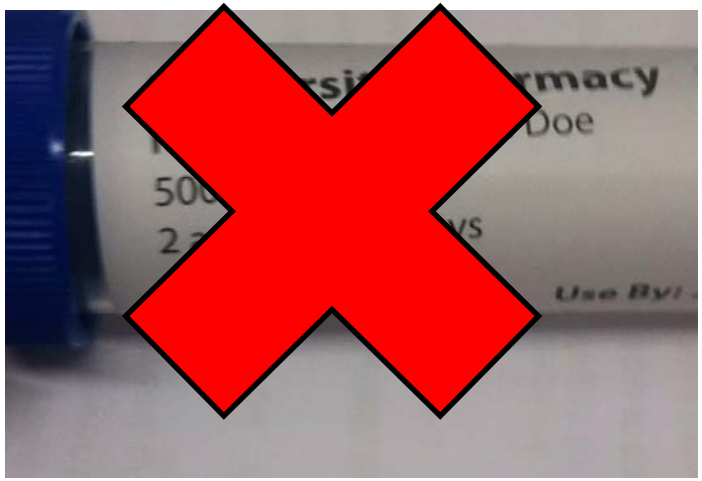






Not taking your antibiotics properly is one way antibiotic resistance can come about.

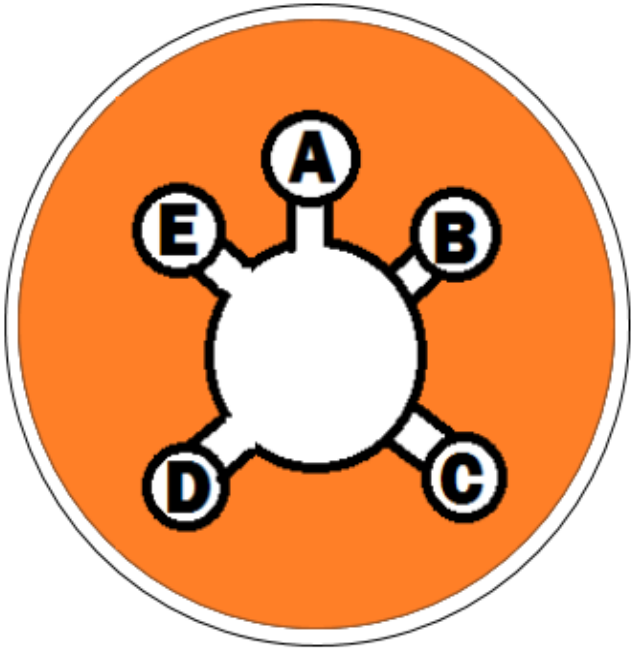
We now know that John's bacteria are resistant to penicillin



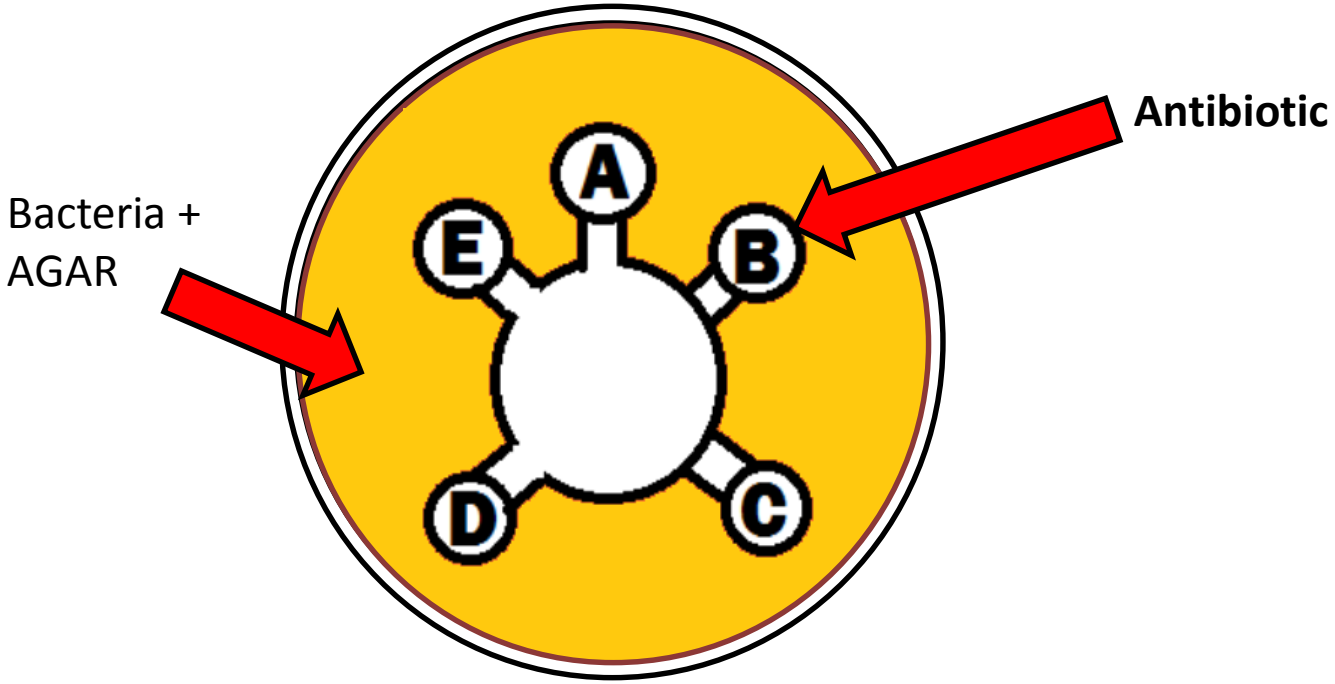
We will now determine what antibiotic John Doe should now take

Loop	**Antibiotic**
A	Penicillin
B	Tetracycline
C	Ofloxacin
D	Erythromycin
E	Gentamycin

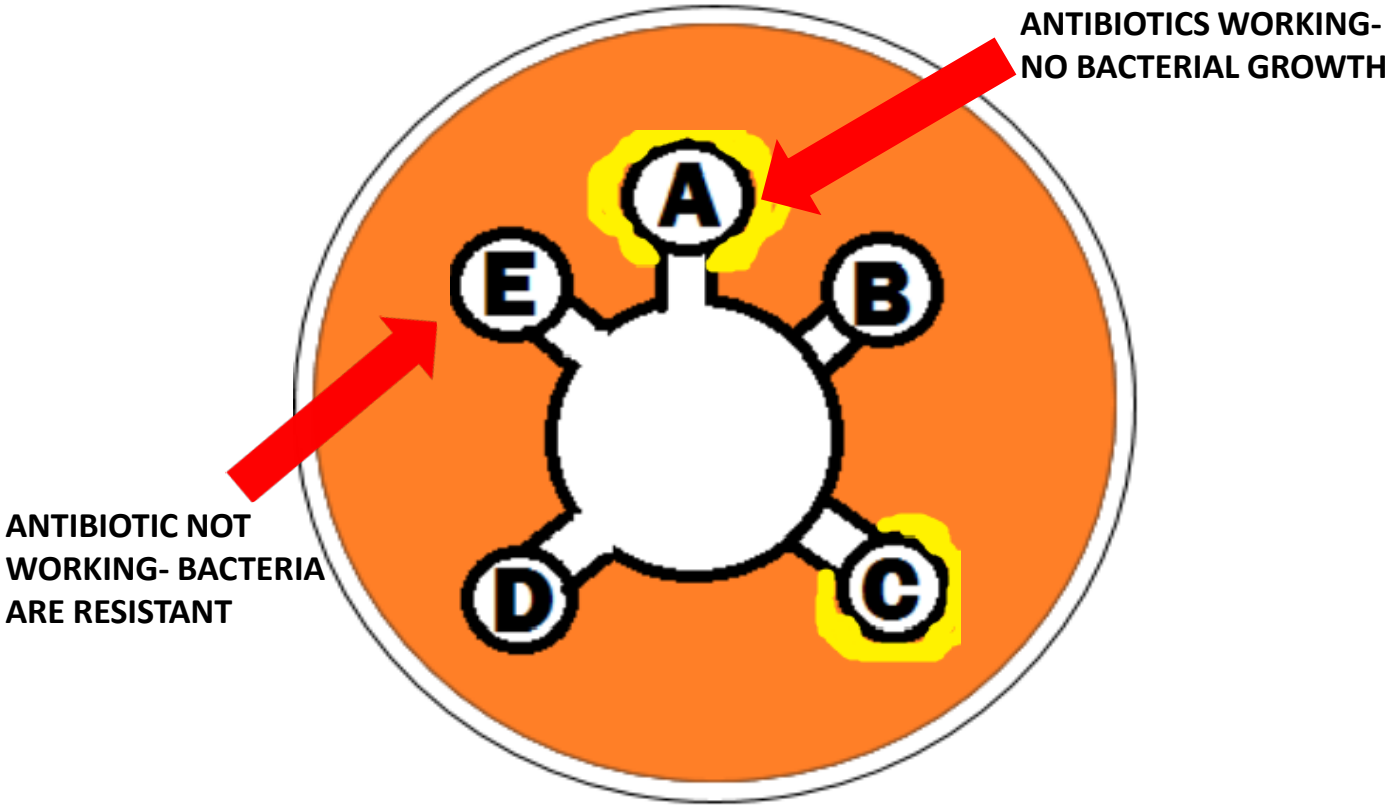
ANTIBIOTIC DISC



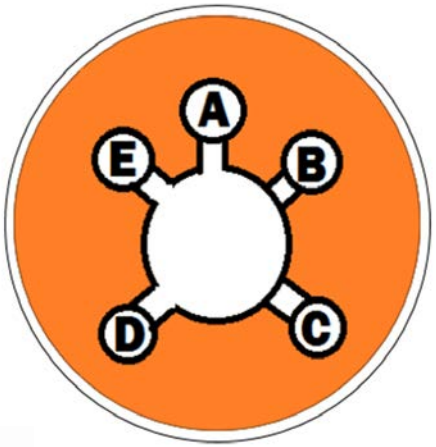
How does an antibiotic disc work?



AFTER 24 HOURS…..



Now you are going to study John's Antibiotic disc



What's next?

Loop	**Antibiotic**
A	Penicillin
B	Tetracycline
C	Ofloxacin
D	Erythromycin
E	Gentamycin

Chapter 7:

John hasn't taken his antibiotics properly for years…

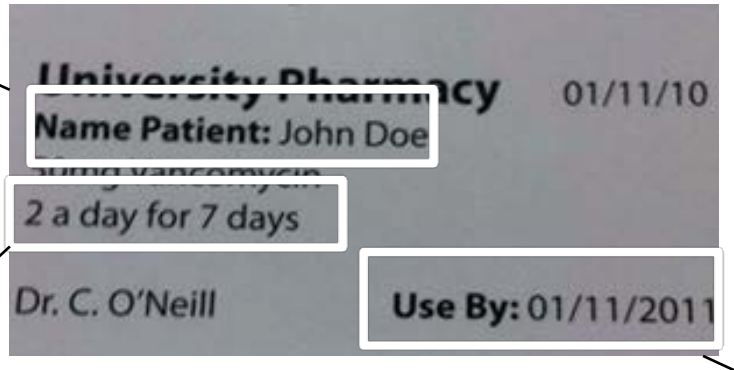
1. In Date
2. For John Doe
3. Enough tablets to complete the prescription

The Medicine Box

Sort out John's Medicine Box to get rid of the antibiotics that don't belong there anymore

Example Pharmacy Label

Patient Name

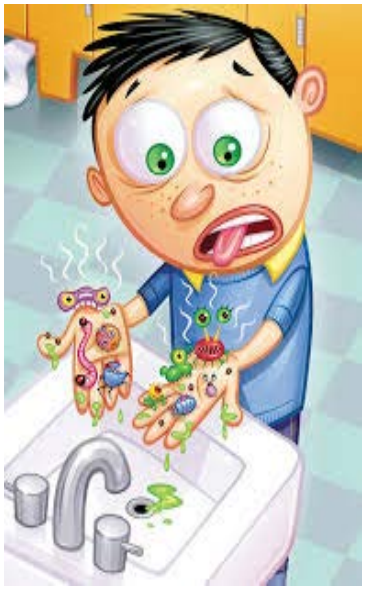


Number of Tablets that should be in tube

Use by date

Strep Throat is **Contagious**

John why do we wash our hands?



To get rid of the bad microorganisms that might make us sick

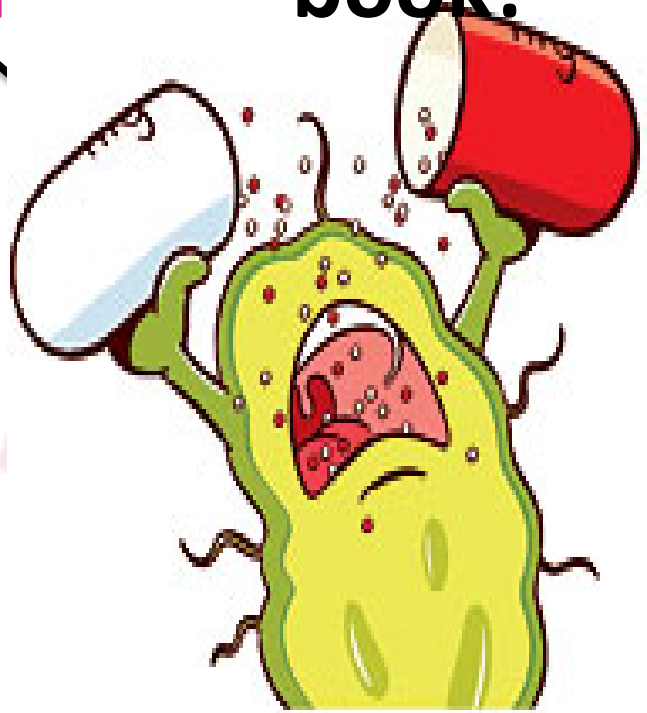
Never take antibiotics that are out of date

Only Take antibiotics

Always take your antibiotics as outlined on the pharmacy label

A lot of people think they know when to take anti

Fill in the blanks in your activity book!



Rules

Never share antibiotics with

Never Take Antibiotics for a cold or flu

Antibiotic R ce is a **HUGE** pr the

Not take

C

Taken wh

not needed

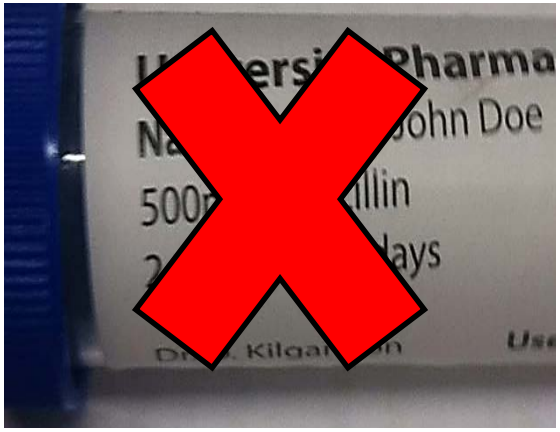
Antibiotic Resistance can effect…

ANYONE

ANY AGE

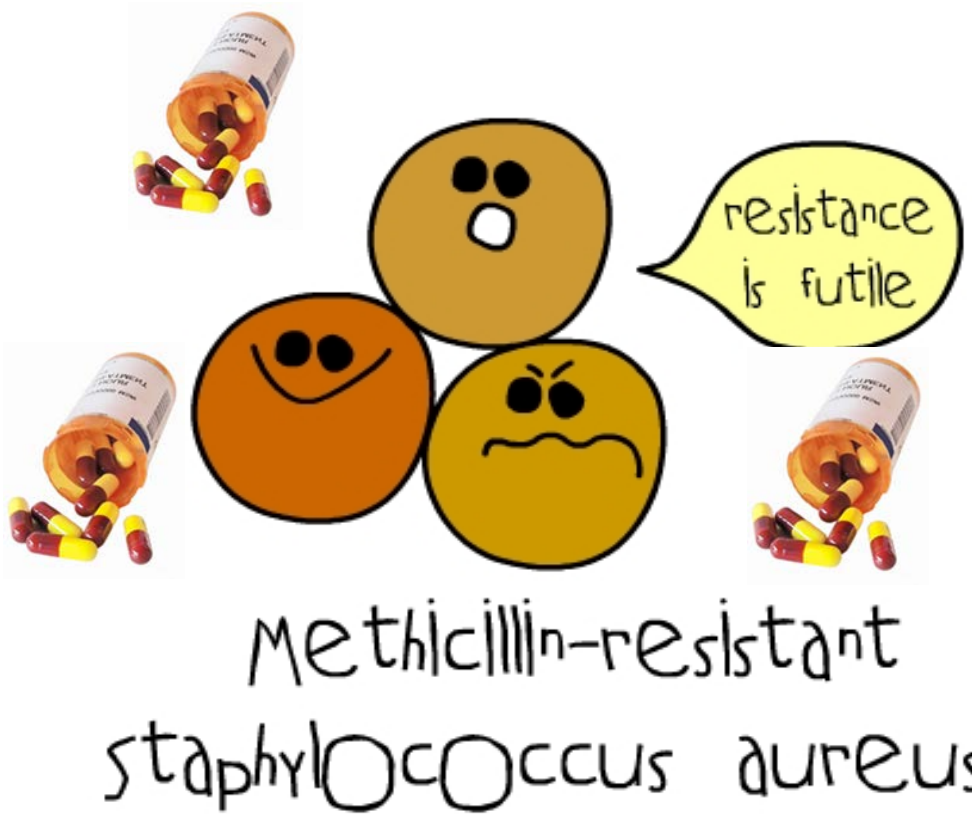
ANY COUNTRY

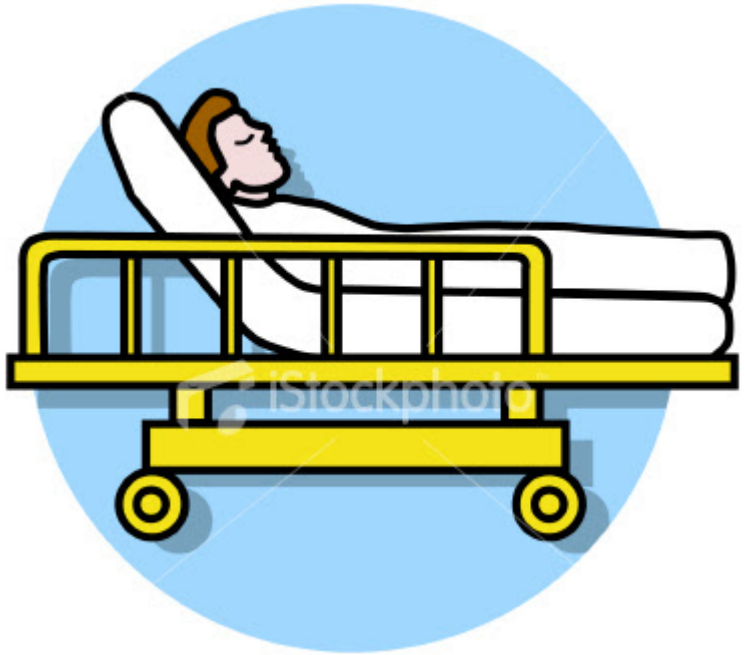
Erythromycin



Multi Resistant bacteria

Superbugs!

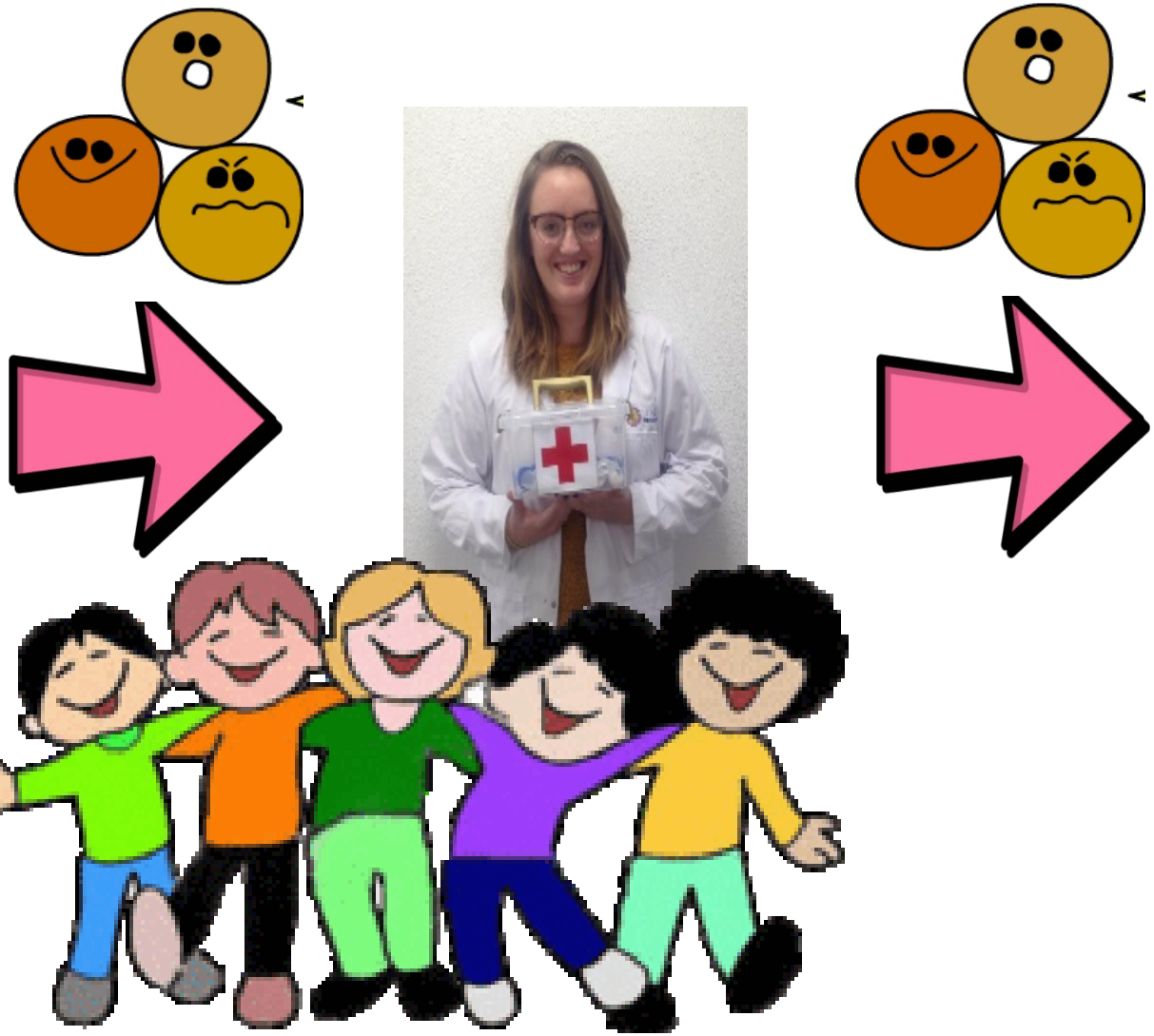




MRSA

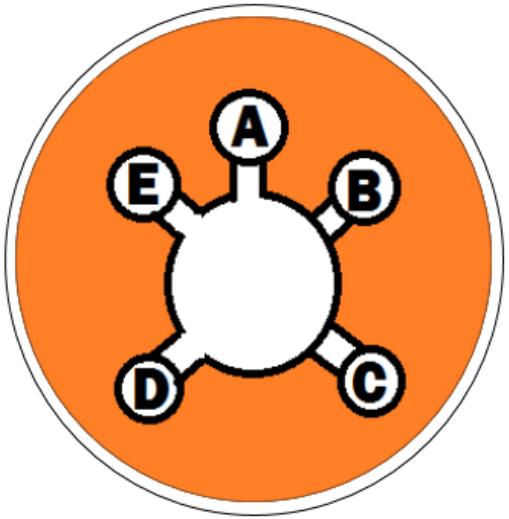
Contagious

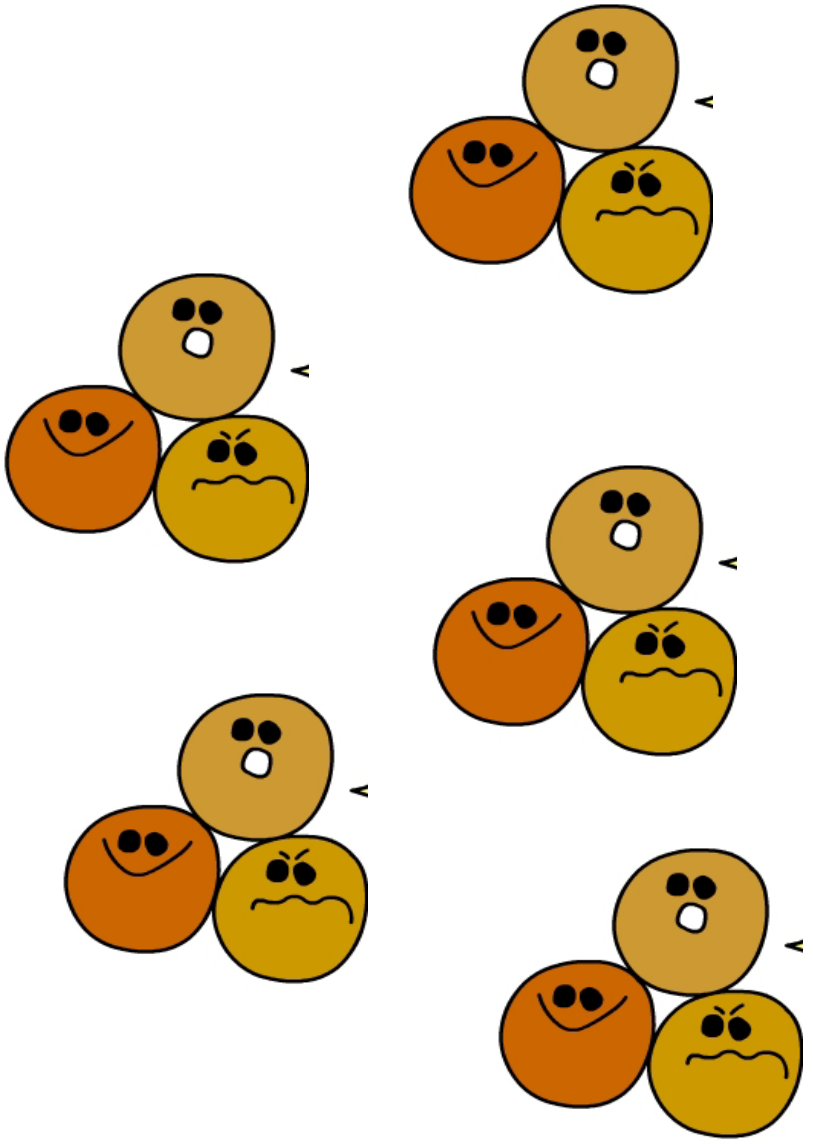
Silent but Deadly



Hygiene

Scientists are Racing Resistance





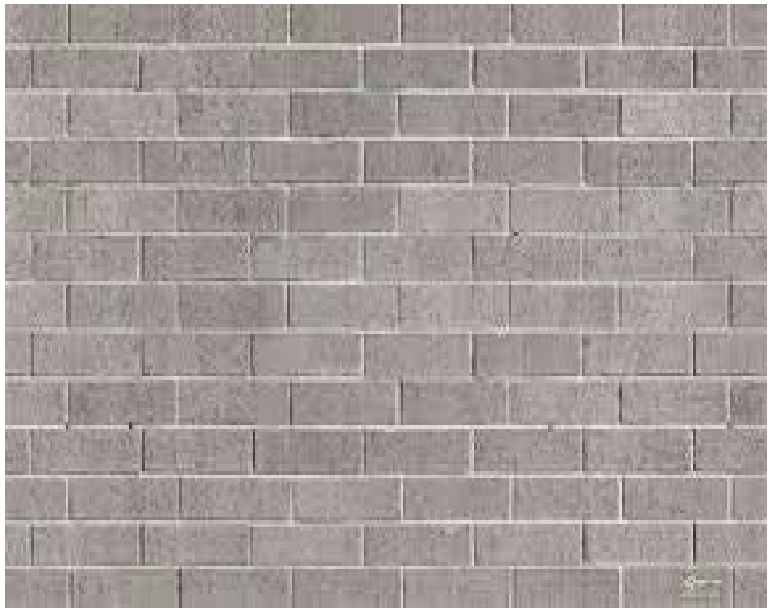
QUIZ

Q1: Colds and Flu's are caused by which microorganism?

Q2: Antibiotics only treat which type of microorganisms?

Bacteria

Q3: What part of the bacteria does penicillin breakdown?



Cell Wall

Q4: Antibiotic Resistance is?

When antibiotic can no longer kill bacteria cause they have changed their shape

Q5: Is it safe to share antibiotics with others?

NO

Why?

Q6: Antibiotic resistance is?

Worldwide Problem

John Doe would like to **Thank You** for helping him Battle his Bacteria!