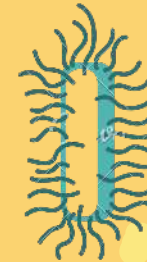
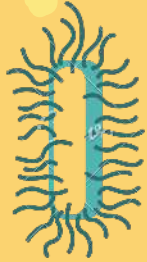


# Superheroes Against Superbugs



DR PONNARI GOTTIPATI, DR SARAH HYDER IQBAL,  
DR SOMDATTA KARAK





# WHO ARE SUPERHEROES?







# WHAT ARE BUGS?



WHAT ARE

SUPER  
BUGS?



# **3 RULES OF ENGAGEMENT**



**1**

**Work in teams**

**2**

**Be curious and ask  
questions**

**3**

**Be curious but  
respectful of each  
other's ideas**

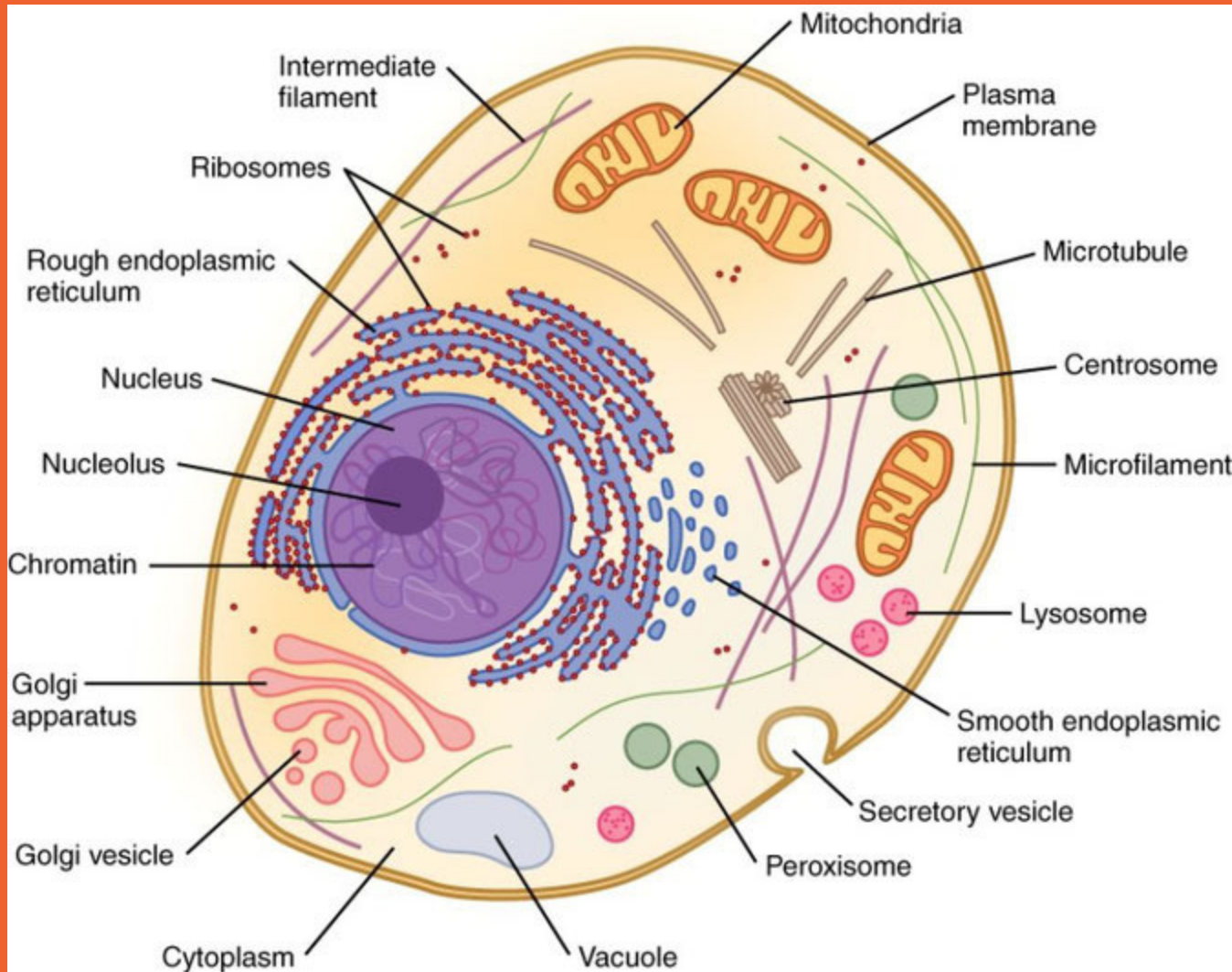


WE ARE ALL MADE UP OF  
CELLS



Let's see what a cell is made up of.

# WE ARE ALL MADE UP OF CELLS



WE ARE ALL MADE UP OF DIFFERENT  
CELLS



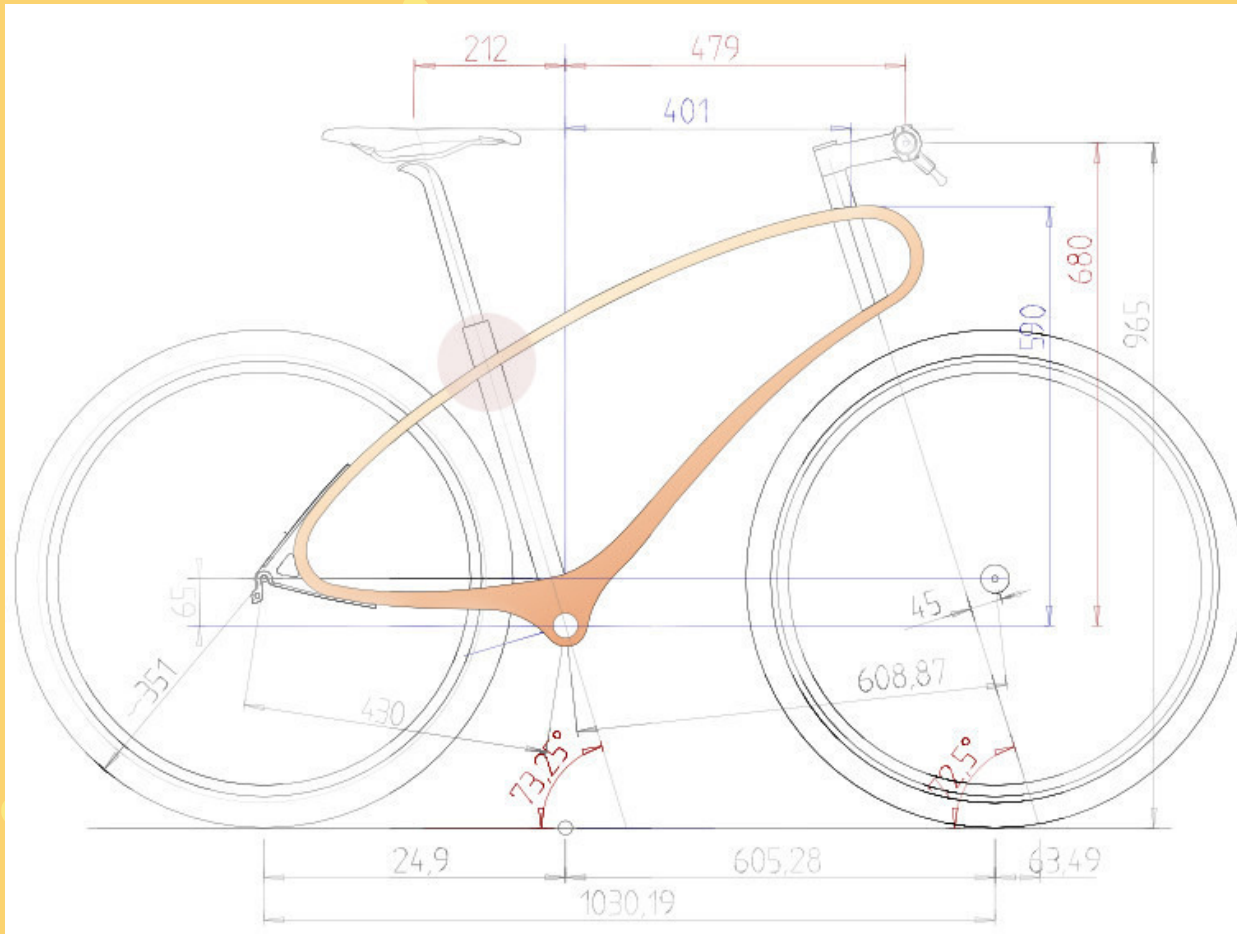
HOW DO CELLS KNOW

WHAT MACHINERY IT SHOULD  
BUILD?



IF YOU HAD TO BUILD A MACHINE  
HOW DO YOU DO IT?

# IF YOU HAD TO BUILD A MACHINE HOW DO YOU DO IT?



**Have a design**

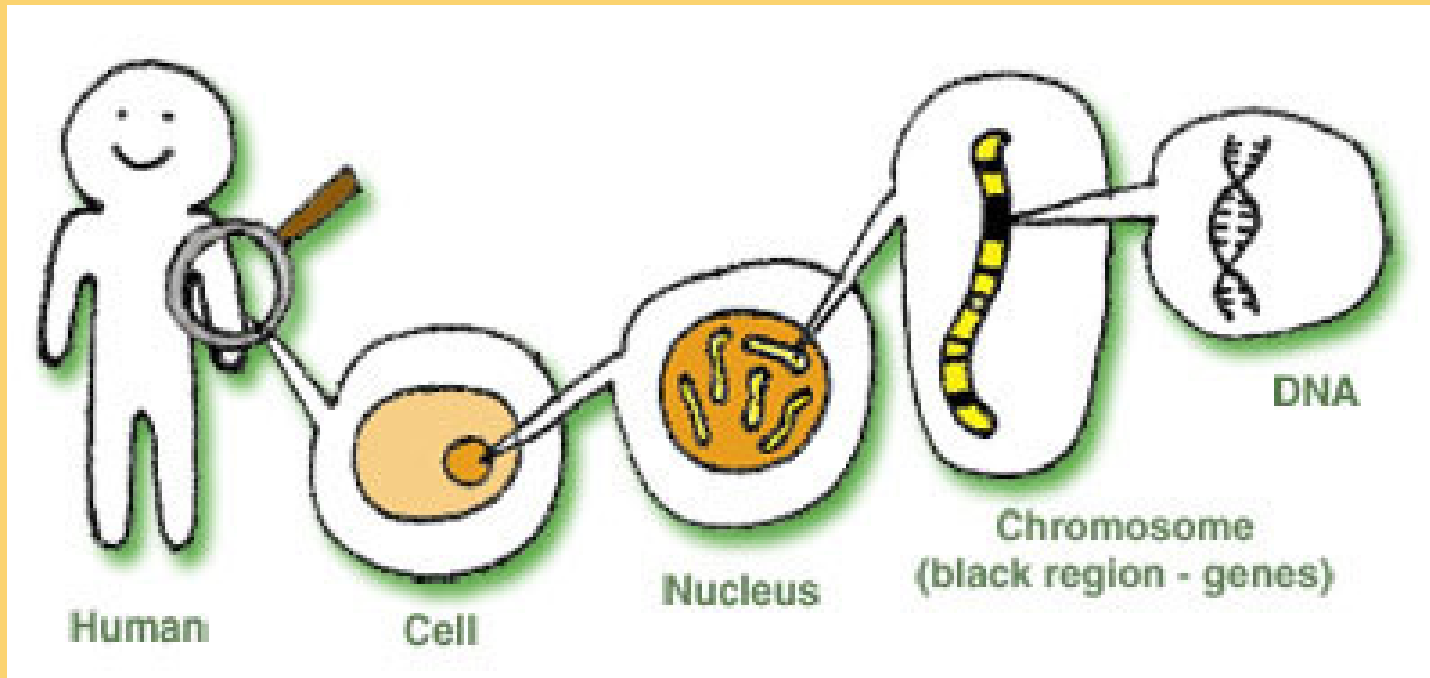
**Being able to read the  
design**





CELLS HAVE THE DESIGNS  
WRITTEN IN GENES

MADE OF DNA



WE ALL SHARE SPACE ON EARTH  
WE LIKE IT OR NOT!



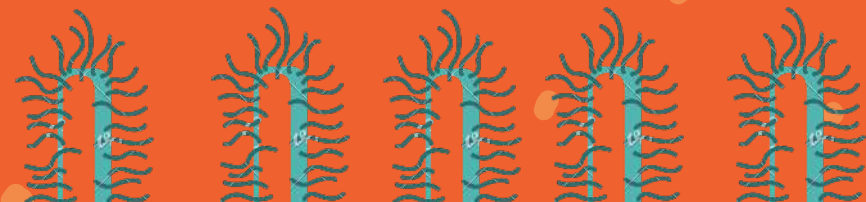
We are vast and small but we cover it  
all

On stones, on walls, and even your skin  
we crawl,

Various places some thrive,

While the rest decline,

Now watch as our presence stand tall.





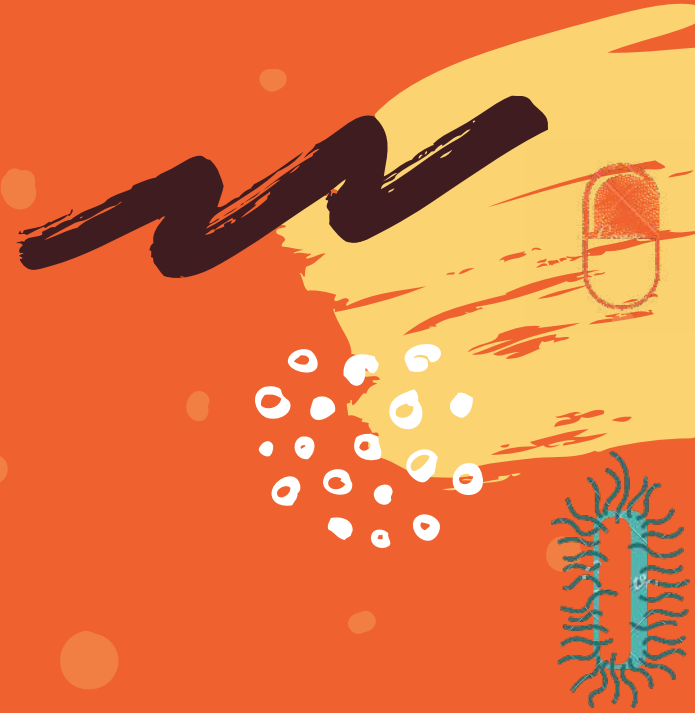
**ACTIVITY: TO UNDERSTAND  
DIFFERENCES BETWEEN DIFFERENT  
MICRO-ORGANISMS/MICROBES**



**KNOW THY TINY  
NEIGHBOURS!**

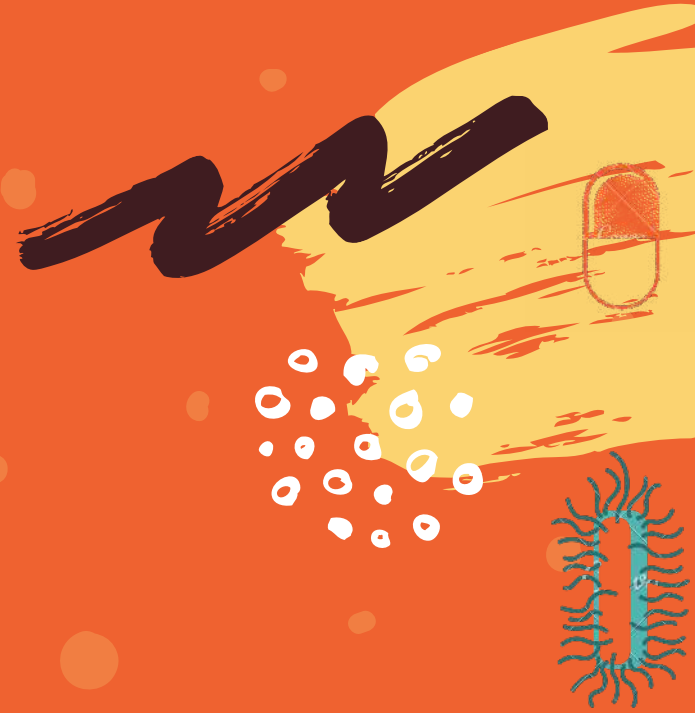


HOW CLOSE ARE THESE  
MICROBES TO US?



# HOW CLOSE ARE THESE MICROBES TO US?

- all around us
- on our bodies &
- inside our bodies



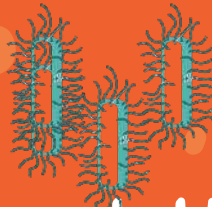
# WHAT KIND OF RELATIONSHIPS DO WE SHARE WITH MICROBES?

- Helpful
- Annoying
- We don't care about them



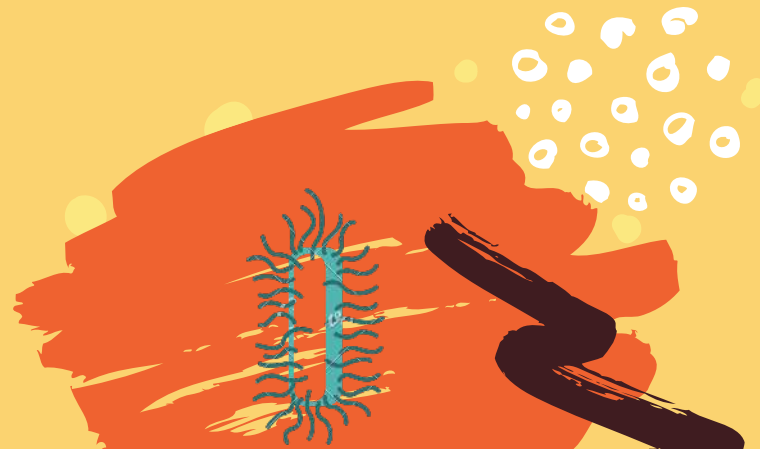
# WHAT KIND OF RELATIONSHIPS DO WE SHARE WITH MICROBES?

- Helpful
- Annoying = Bugs
- We don't care about them





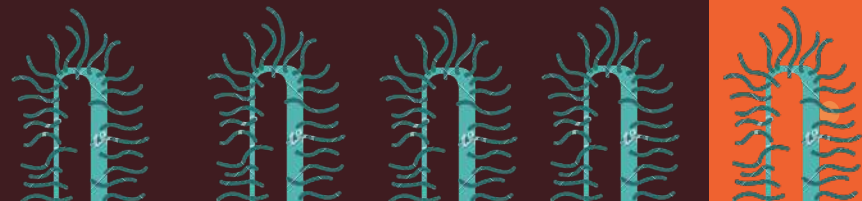
**CAN WE FIGHT THE BUGS?**



# SOME THINGS TO REMEMBER TO FIGHT BUGS

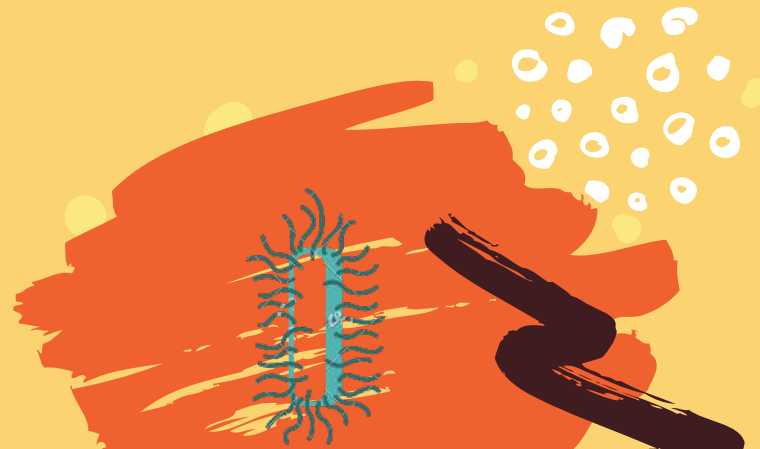


- 1 Prevent them from entering body by maintaining hygiene.
- 2 Our bodies can identify bugs and kill them selectively.
- 3 Our bodies can also identify bugs they have met before, and kill them faster the second time on.
- 4 We need to rest when our body is fighting bugs so that it is not too stressed.
- 5 Kill bugs by other means, like???





**WHAT ELSE CAN KILL MICROBES?**

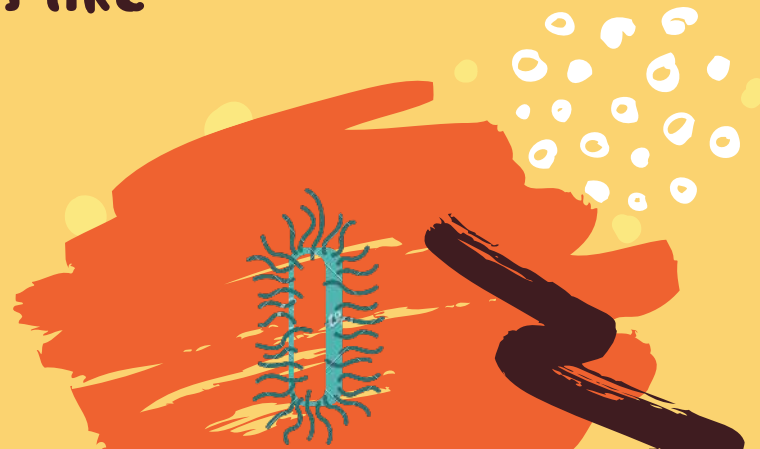




# WHAT ELSE CAN KILL MICROBES?

## OTHER MICROBES

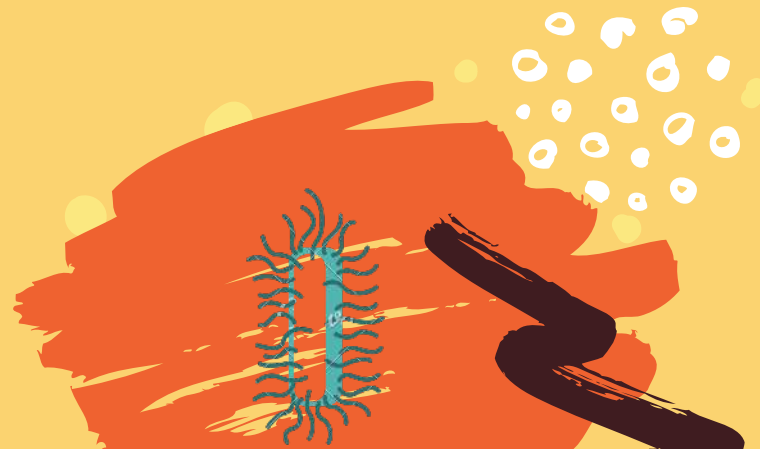
After all, who likes sharing resources like food and space?!





# HOW CAN A MICROBE KILL ANOTHER?

Watch the video and make a note of how a  
fungus can kill a bacteria

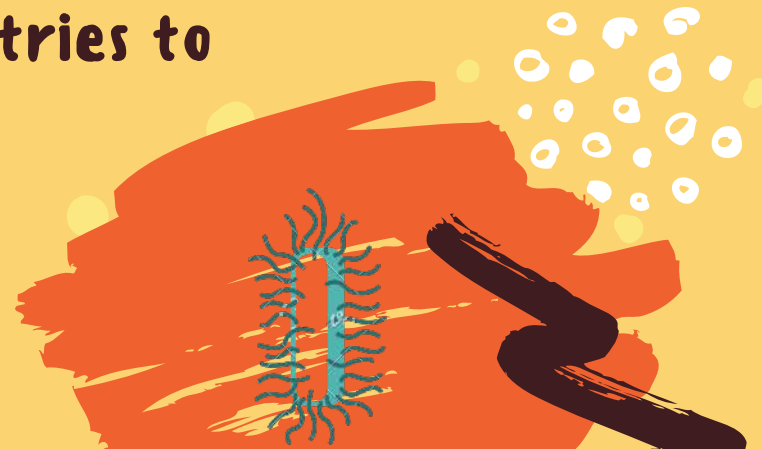




# HOW CAN A MICROBE KILL ANOTHER?

Via **ANTIBIOTICS**

We also started making them in industries to  
treat many infections.





# HOW COMMON ARE ANTIBIOTICS IN OUR LIVES?

On an  
average

**11**  
antibiotic  
pills/Indian/  
year

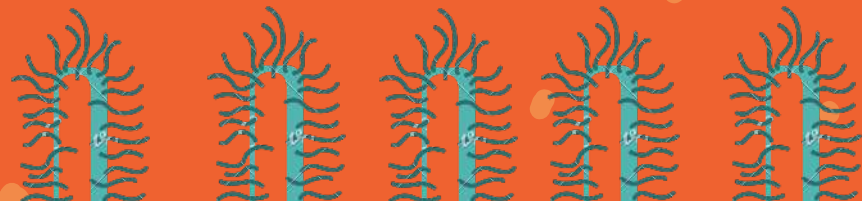
**22**  
antibiotic  
pills/US  
citizen/year



# POINTS TO REMEMBER

1

**ANTIBIOTICS CAN KILL ONLY BACTERIA  
INCLUDING THE FRIENDLY GUT BACTERIA**



# POINTS TO REMEMBER



2

ANTIBIOTICS CANNOT KILL OTHER MICROBES LIKE VIRUSES. SO KNOW WHAT MICROBE HAS INFECTED YOU BEFORE YOU TAKE AN ANTIBIOTIC.

