

Microbe of the month

Breaking The Chain of Infection

Cutimed®

MAY 2022 NEWSLETTER

Compiled by
Helen Loudon IPC Consultant

[CLICK HERE TO DOWNLOAD](#)



Featured this month:

FUN FACTS ABOUT BACTERIA

The Good, the Bad, and the Ugly

Hello readers!

The aim of the Microbe of the Month newsletter is to help create awareness about microorganisms of clinical importance, in an easy to read and understand format. Each newsletter provides insights into prevalent healthcare-related pathogens and those aspects which are relevant to Infection Prevention and Control (IPC), and Antimicrobial Stewardship (AMS) practice.

Please use this newsletter as a teaching tool in your workplace, share it widely and start an 'infectious dialogue' about topical issues in infection control!

This month, I thought I would 'get back to basics', because an understanding of and appreciation for the uniqueness of microbes and how indispensable they are to us in our everyday lives is integral to Infection Control practice!

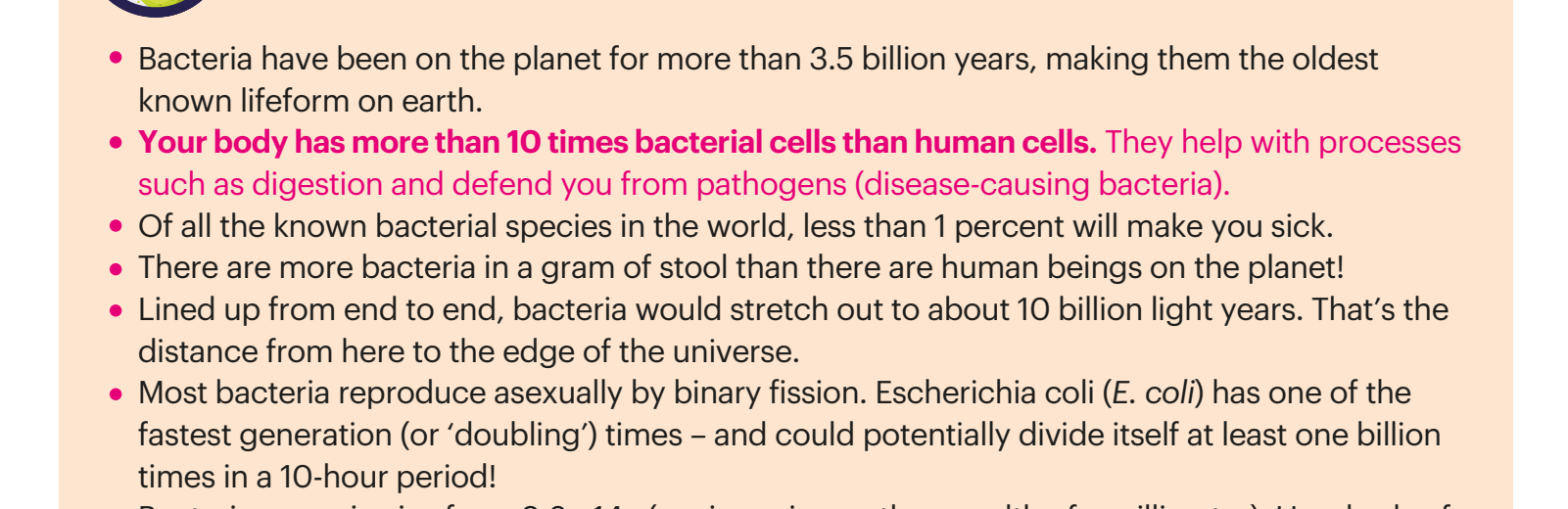
Bacteria are not only intelligent, but are an excellent example of successful evolution. Many species play an enormously valuable role – most bacteria are not harmful; indeed, they are essential for human, animal and environmental health.



Watch this 2-minute video on **Antonie van Leeuwenhoek** (the 'Father of Microbiology'), and his discovery of 'animalcules' in 1683!

https://www.youtube.com/watch?v=c_BIL12v6OE

Get in touch with us for more information and free samples of our wound care solutions



CLICK HERE to get your free AMR kit

CLICK HERE to find out more about Essity

CLICK HERE Watch a short video on **Cutimed® Sorbact®** including benefits, uses and instructions

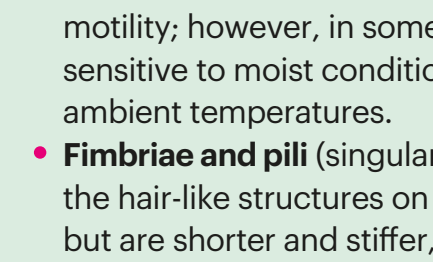


[CLICK HERE TO DOWNLOAD THE NEWSLETTER](#)

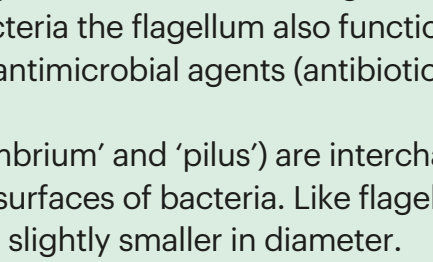


BY THE NUMBERS 1,2,3

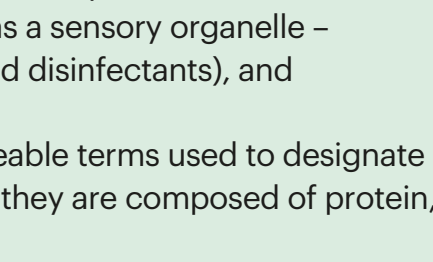
- Bacteria have been on the planet for more than 3.5 billion years, making them the oldest known lifeform on earth.
- Your body has more than 10 times bacterial cells than human cells. They help with processes such as digestion and defend you from pathogens (disease-causing bacteria).**
- Of all the known bacterial species in the world, less than 1 percent will make you sick.
- There are more bacteria in a gram of stool than there are human beings on the planet!
- Lined up from end to end, bacteria would stretch out to about 10 billion light years. That's the distance from here to the edge of the universe.
- Most bacteria reproduce asexually by binary fission. *Escherichia coli* (*E. coli*) has one of the fastest generation (or 'doubling') times – and could potentially divide itself at least one billion times in a 10-hour period!
- Bacteria range in size from 0.3 - 14µ (a micron is one thousandth of a millimetre). Hundreds of thousands of bacteria could fit into the size of the full stop at the end of this sentence.



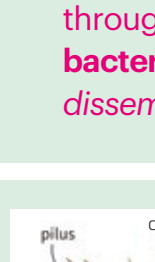
A red blood cell is 5µ (microns)



The average diameter of a human hair is 50µ

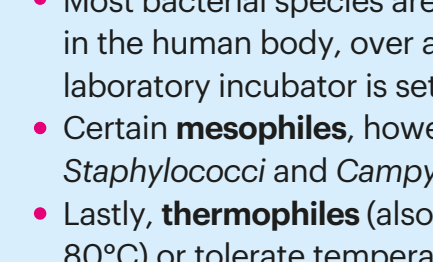


A bacterium dividing by binary fission

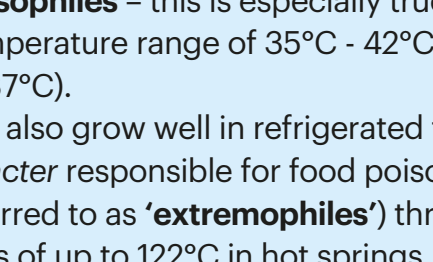


BACTERIA ARE FAST 2,3,4

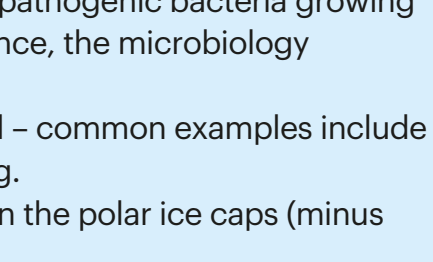
- A bacterium can typically move about 100 times the length of its body in a single second.
- A **flagellum** (plural: 'flagellae') is a hair-like protein structure which protrudes from a wide range of microbes – a bacterium may have one or several flagella. The primary function is that of motility; however, in some bacteria the flagellum also functions as a sensory organelle – sensitive to moist conditions, antimicrobial agents (antibiotics and disinfectants), and ambient temperatures.
- Fimbriae and pili** (singular: 'fimbrium' and 'pilus') are interchangeable terms used to designate the hair-like structures on the surfaces of bacteria. Like flagellae, they are composed of protein, but are shorter and stiffer, and slightly smaller in diameter.
- Fimbriae enable bacteria to adhere to surfaces and tissues.**
- Generally, fimbriae have nothing to do with bacterial movement – there are exceptions, however; for example, the twitching movement of *Pseudomonas* and *Proteus* species.
- 'Sex pili' form spontaneously, to join two bacteria together (not necessarily the same species) through a bridge-like connection, enabling the transfer of genetic material – this is termed bacterial conjugation and is an important mechanism for how bacteria acquire and disseminate antibiotic resistance.**



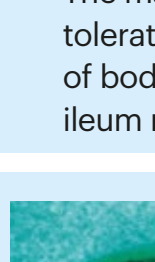
Basic morphology (structure) of the bacterial cell



Electron microscope image of flagellae on *Pseudomonas aeruginosa*

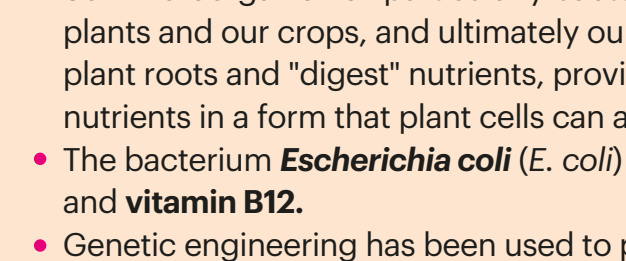


Bacterial conjugation between *E. coli* via a 'sex pilus'

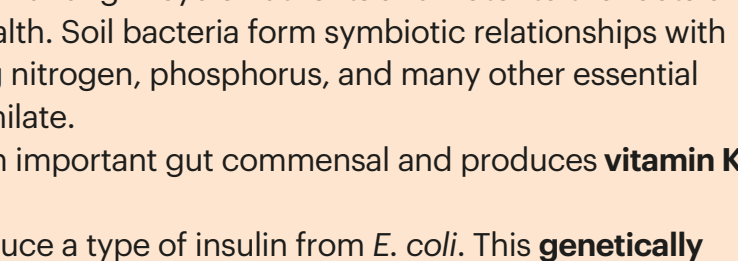


BACTERIA ARE MASTERS OF ADAPTATION 1,3,5

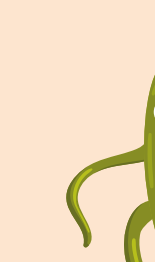
- Bacteria inhabit almost every environment on Earth due to natural evolution and their unique ability to tolerate a vast variety of physical conditions.
- Most bacterial species are **mesophiles** – this is especially true of pathogenic bacteria growing in the human body, over a temperature range of 35°C - 42°C (hence, the microbiology laboratory incubator is set at 37°C).
- Certain **mesophiles**, however, also grow well in refrigerated food – common examples include *Staphylococci* and *Campylobacter* responsible for food poisoning.
- Lastly, **thermophiles** (also referred to as 'extremophiles') thrive in the polar ice caps (minus 80°C) or tolerate temperatures of up to 122°C in hot springs.
- Some bacteria are neither aerobic nor anaerobic, and are termed '**facultative**'. Facultative anaerobes prefer aerobic conditions, but, if necessary, these bacteria will grow in the absence of oxygen by using fermentation for energy.
- The majority of bacterial species grow best under neutral conditions (pH 7.0); however, some tolerate acidic conditions as low as pH 2.0, and alkaline conditions as high as pH 9.5. Examples of body sites with a low pH include the stomach and the vagina, whereas the pH in the terminal ileum ranges from a pH 7.0 – 9.0.



Deinococcus radiodurans can survive almost 10,000 times the dose of radiation lethal to humans!*

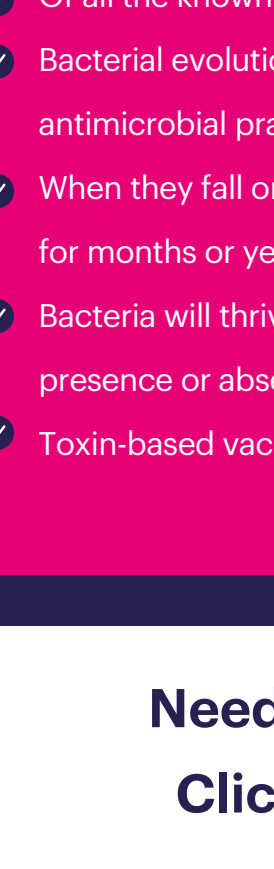


The Morning Glory hot spring in Yellowstone National Park. The vivid blue colour is from *Cyanobacteria* which thrive in its very hot waters.



BACTERIA, FOOD, ANTIBIOTICS AND INSULIN 1,6,7,8,9

- Currently, more than 3500 traditionally fermented foods exist in the world.
- Fermentation is one of the oldest transformation and preservation techniques for food – yeasts, moulds and bacteria are all used to make food products such as bread, beer, wine, vinegar, yoghurt and cheese, as well as fermented fish, meat and vegetables.
- This biological process not only allows the preservation of food, but also improves its nutritional and **organoleptic qualities** (relating to the senses – taste, sight, smell, touch).
- Antibiotics are chemicals which kill or inhibit the growth of bacteria, and are used to treat bacterial infections. They are produced in nature by soil bacteria (*Streptomyces*, for example); and **over 5000 antibiotic substances have been described to date, of which at least 100 are routinely prescribed to treat infection.**
- Soil microorganisms - particularly bacteria and fungi – cycle nutrients and water to the roots of plants and our crops, and ultimately our health. Soil bacteria form symbiotic relationships with plant roots and "digest" nutrients, providing nitrogen, phosphorus, and many other essential nutrients in a form that plant cells can assimilate.
- The bacterium ***Escherichia coli*** (*E. coli*) is an important gut commensal and produces **vitamin K and vitamin B12**.
- Genetic engineering has been used to produce a type of insulin from *E. coli*. This **genetically modified insulin**, 'Humulin', was licensed for human use in 1982.



"I'm your bacteria buddy here to help you out. Don't let my scary looks make you scream or shut! I'm not nasty, or scary or mean... I'm here to get your city's water clean! If you use the toilet or take a shower, the dirty water goes to the place where I use my power! I nibble and gobble the dirty water all day, then the clean water goes to the river and evaporates away – Up to form fluffy clouds and then rain falls, Look! There's new clean water for one and all!" //



THE BOTTOM LINE...

- ✓ Bacteria are **everywhere!**
- ✓ An understanding of bacterial structure and virulence mechanisms is essential for infection control and the selection of antiseptics, and antibiotic stewardship.
- ✓ Your body has more than 10 times bacterial cells than human cells. They help with processes such as digestion and defend you from opportunistic pathogens.
- ✓ Of all the known bacterial species in the world, less than 1 percent will make you sick.
- ✓ Bacterial evolution is a constant process driven by natural selection, and environmental and antimicrobial practices.
- ✓ When they fall on 'hard times', some bacteria turn themselves into spores and can hibernate for months or years.
- ✓ Bacteria will thrive under a variety of environmental conditions, temperatures, and in the presence or absence of oxygen.
- ✓ Toxin-based vaccines and antibiotics are bacteria's gift to humanity.

Need product or newsletter information? Click here and an Essity representative will contact you

REFERENCES

- Alcamos, J.E. (2001). Fundamentals of Microbiology. Jones and Bartlett: Boston, Toronto, London, Singapore.
- Gladwin, M. Trattler, W. Mahan, C (2014). Microbiology made ridiculously simple. MedMaster Inc. 6th Ed.
- Ten Fast Facts About Bacteria. Nova Biologicals Online 23rd February 2018. <https://www.novaxt.com/household-testing/10-fast-facts-bacteria/>
- Todar, K. Online Textbook of Bacteriology. <http://textbookofbacteriology.net/>
- Rice, J. 20 Things You Didn't Know About Bacteria. Online 23rd October 2008. <https://www.discovermagazine.com/health/20-things-you-didnt-know-about-bacteria>
- European Food and Feed Cultures Association (EFFCA). Online <https://effca.org/microbial-cultures/food-production/> Accessed 18.3.2022.
- Sethi S., Kumar R., Gupta S. Antibiotic Production by Microbes Isolated from Soil. Int. Jnl Pharm Sciences and Research 2013; Vol. 4(8): 2967-2973. <http://ijpsr.com/bft-article/antibiotic-production-by-microbes-isolated-from-soil/?view=fulltext>
- Your Genome Online. What is Genetic Engineering? <https://www.yourgenome.org/facts/what-is-genetic-engineering> Accessed 18.3.2022.
- Blount ZD. The unexhausted potential of *E. coli*. Elife 2015 Mar 25;4:e05826.doi: 10.7554/eLife.05826. PMID: 25807083; PMCID: PMC4373459.
- Monologues for Teenagers. <https://www.dramanotebook.com/monologues-teenagers/>

Essity, 30 Gillits Road, Pretoria 2010. Phone: +27 31 710 8111. Email: medical.essity@essity.co.za www.essity.com

Cutimed® is a registered trademark of BSN Medical GmbH. / Sorbact® is a registered trademark of ABIGO Medical AB.

BSN Medical PTY (LTD) an Essity Company. Co. Reg. No. 2000/00394/07. 30 Gillits Road, Pretoria 2010.

www.medical.essity.co.za
www.soundswear.com.co.za
Phone: +27 31 710 8111
TollFree orders: 0800 202 858/9

Good healthcare starts with good hygiene

Reduce Risk and Secure the new hygiene standard with **Tork**

When hands-free hygiene is crucial in order to reduce cross-contamination and meet Regulations, Tork has all the right products to offer. One-at-a-time dispensing reduces waste and helps improve hygiene

- Peakserve Paper Towel – offers the highest capacity of up to 2132 sheets
- SmartOne Toilet Paper System – Reduces blockages and rolls last longer
- Tork Soap systems – Giving you up to 2500 doses

Contact us on tork.rs@essity.com or www.tork.co.za

Essity, 30 Gillits Road, Pretoria 2010. Phone: +27 31 710 8111. Email: medical.essity@essity.co.za www.essity.com

Tork an Essity brand

Cutimed® Sorbact®

Effective infection management

Up to 73% bacterial reduction in critically colonised wounds!

Cutimed® Sorbact® Mode of action

Leukomed® Sorbact® and Cutimed® Sorbact® utilise the effective Sorbact® Technology that binds bacteria with a purely physical mode of action. Sorbact® Technology removes bacteria without releasing possibly harmful endotoxins.*

• Clinically significant 65% relative risk reduction of acquiring a surgical site infection post caesarean section¹

• Up to 57% cost reduction of SSI when treating caesarean sections, using NHS cost model²

• Effective reduction of the bacterial burden in critically colonised or locally infected wounds³

Leukomed® Sorbact® Surgical site infection prevention

• Cost-effective surgical site infection prevention...

• Proven infection management...

• Physical microbe binding technology...

Essity, 30 Gillits Road, Pretoria 2010. Phone: +27 31 710 8111. Email: medical.essity@essity.co.za www.essity.com

Leukomed® by **Leukoplast®**

Sorbact® is a registered trademark of ABIGO Medical AB.