



MRSA & SARS

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Introduction

Our class divided into teams to research and report on global diseases caused by viruses and bacterium.

Our team researched and reported on the SARS virus and the MRSA bacteria.

We will discuss:

- Virus vs bacteria
- History of SARS and MRSA
- Symptoms
- Treatment
- Prevention
- Contracting
- Prevalence

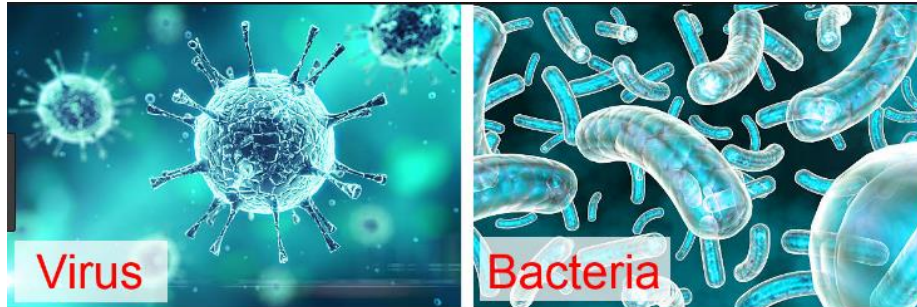
Virus vs Bacteria – There is a difference

Virus

- Pathogen
- Not living organism
- Submicroscopic
 - Only grow and reproduce inside of the host cells of the animal they infect
 - Dormant outside of living cells

Bacteria

- Pathogen
- One celled organism – living
 - Much larger than a virus
 - alive outside of a host



History

- MRSA became a problem around 1940's , this bacteria was mostly targeted infected skin most of the time and it took awhile for it to heal, also if this bacteria were to ever go into your bloodstream it would cause infections in your organs and mainly head to your heart this is called endocarditis, which your heart would have hard time fighting this infection. In 1956 an antibiotic was introduced for MRSA.

History

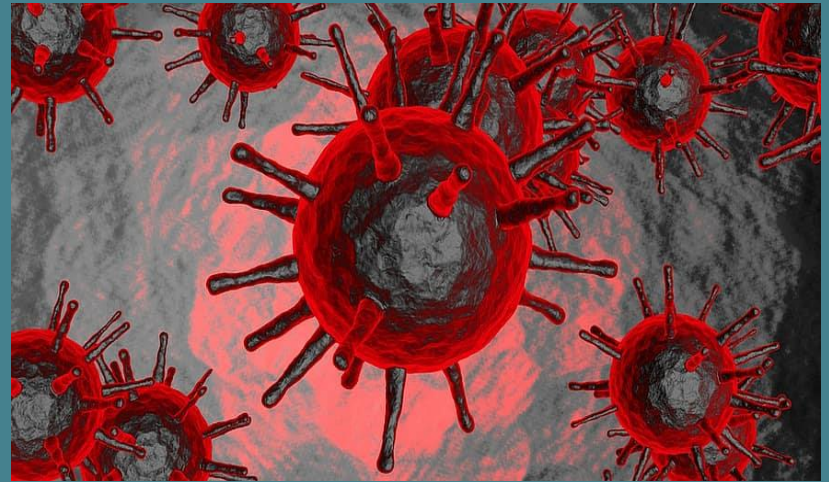
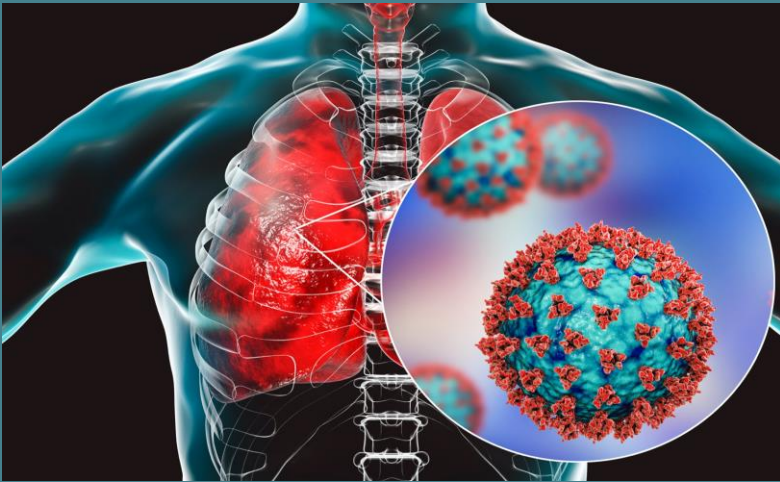
- Professor Patricia Jevons observed the first culture of MRSA at Colindale Laboratories in London, this infection was very easy to get, some people would get it through an infected wound. If someone were to have mrsa on a specific wound, it would take weeks, even up to years for it to clear up. In 1940 when the first outbreak happened, there wasn't any antibiotics for this specific infection, everyone who had this infection was told to wash there hands constantly and stay clean as possible.

History

- In 2003, SARS had its first outbreak that reached up to 110,000 cases worldwide. In 2002 this virus was originated in china, experts say this strain was found in mammals, to the point where it was able to infect humans as well but this disease was not reported until 2003 when people were feeling symptoms. 15 years ago it was said that by the end of January there was 115 countries infected with this virus

History

- In 2003 “CDC reinstated travel alert for Toronto because on May 22, Canadian health officials reported a cluster of five new probable SARS cases.”



MRSA- Bacteria

- Methicillin-Resistant Staphylococcus Aureus (MRSA) is a staph infection, caused by staphylococcus bacteria that multiplies uncontrollably on the skin and in the nose.
- MRSA infections mainly occur when we have cuts or breaks in our skin.
- This infection is very contagious & can be contracted through direct contact
 - You can also be infected by MRSA through objects that have been touched by someone who been tested positive.
- There are two types of MRSA
 - HA-MRSA
 - CA-MRSA

Symptoms

- Rash
- Chest Pains
- Headaches
- Shortness of Breath
- Muscle Aches
- Cough
- Chills
- Fever
- Fatigue

SARS – Virus

- Severe Acute Respiratory Syndrome (SARS) is a viral respiratory illness.
- SARS is an airborne disease that is spread by person-to-person contact.
 - The virus can also be spread through a person's touch or an object that is contaminated by SARS.

Symptoms

- Fever
- Dry Cough
- Most people develop pneumonia
- Headache
- Bodyache
- Diarrhea

Treatment

SARS

- There is no vaccine available for treatment of SARS. A patient diagnosed with SARS receives supportive care treating the symptoms as they arise. Treatment can include the following:
 - Oxygen
 - Antibiotics or Antiviral medications
 - Breathing treatments
 - Corticosteroids

MRSA

- There have been many clinical trials done to create a vaccine for MRSA but all have failed due to its ability to adapt and build an immunity to them.
- Antibiotics
- In other cases, a small surgical procedure may be done to help get rid of the infected tissue if still localized
- Mupirocin ointment and chlorhexidine soap may be prescribed

Prevention

- SARS is spread via airborne pathogens and droplets so the best prevention for it is to avoid anyone that has a confirmed case of SARS and taking necessary precautions such as face coverings hand washing and wiping down surfaces that could possibly be contaminated.
- MRSA is spread from skin to skin contact or by touching contaminated objects. Again, the best defense against this is using extra cleaning precautions to get rid of any bacteria on objects that you may come into contact with. Also be aware of someone that may have MRSA and use proper PPE such as gloves and aprons when dealing with such.

Contracting

- If you develop symptoms of SARS you should immediately consult a physician and potentially contact your local health department for more guidance. Generally, you will either be admitted into the hospital or advised to quarantine yourself if symptoms do not require hospitalization.
- For MRSA you should immediately contact your primary care doctor and take special precautions such as keeping the infected area clean and always covered with a dry sterile bandage. You should avoid scratching or picking at the infection site and use good hygiene such as washing your hands

MRSA Prevalence

1. There are less than 200,000 diagnoses a year.
2. 5% of hospital patients will carry MRSA on their nose or other exposed skin areas.
3. 1 out of 3 people carry staphylococcus aureus. (The type of bacteria that leads to MRSA)
4. Diabetics are at a higher risk. A test was done to gather information on the colonization of MRSA in diabetics compared to non diabetics. 11,577 diabetics were tested and 9.20% had MRSA colonization. Non diabetics had 4.45%, a 4.75% difference.

MRSA Tracking Project

- “Staphylococcus aureus is a leading cause of healthcare-associated infections in the United States and an important cause of serious infections in the community.”
- The Emerging Infections Program MRSA surveillance program was started in 2004. .
- The Project Focuses on:
 - Monitoring for changes in the infection, and the impact of treatments
 - Finding which population will benefit the most from improved treatments.
- There have been seven states that have been apart of the program. There have been 16 million people surveilled so far

SARS Prevalence

- 8,098 people were infected with SARS across 20 countries and 774 deaths total.
- The United States only had 8 confirmed SARS patients.
- The last known case was in 2004
- “Much like how Covid-19 has spread, the first people in the U.S. impacted by SARS had traveled to other parts of the world where the infection was spreading.”

Covid-19 Prevalence

- 141 million cases and 3 million deaths.
- The United States has been 32 million cases and 600 thousand deaths.
- Arkansas alone has 300 thousand cases and 6000 deaths.
- Obesity, diabetes, and lung conditions can increase one's risk for covid, and the damage that it can cause.

Has Covid Spread Everywhere?

- There are a few islands and territories that have not had any confirmed cases. The success is due to travel bans and restrictions. This picture is of Tonga Island, who at the first of the year, still had no confirmed cases. Tonga island is off of the southern Pacific Ocean and has a population just over 100,000.



Conclusion

- As apart of the human race we have completely stopped the spread of SARs, and suppressed MRSA to a small amount of cases a year. With the vaccine becoming more accessible to the world, we soon will be able to put Covid-19 to rest.

Acknowledgements

- Dr. Ted Siebert
- Professor Dianne Phillips

Citations

<https://www.healthline.com/health/mrsa>

<https://www.cdc.gov/sars/about/fs-sars.html>

<https://pubmed.ncbi.nlm.nih.gov/30955124/#:~:text=From%2023%20data%20sets%2C%20the%20prevalence%20of%20MRSA,a%204.75%25%20greater%20colonisation%20rate%20%28P%20%3C%200.0001%29.>

<https://www.cdc.gov/mrsa/community/index.html>

https://www.cdc.gov/hai/eip/saureus.html#anchor_1609957324

<https://www.cdc.gov/hai/eip/pdf/MRSA-2021-P.pdf>

<https://www.usnews.com/news/best-countries/slideshows/countries-without-reported-covid-19-cases>

<https://www.nationalgeographic.com/travel/best-winter-trips-2017/tonga-beach-adventure-archipelago-southern-pacific-ocean/>

<https://www.disabled-world.com/health/mrsa/>

<https://www.cdc.gov/sars/about/fs-sars.html>

Jacalyn Duffin, & Arthur Sweetman. (2006). *SARS in Context : Memory, History, and Policy*. McGill-Queen's University Press.

John Wong, & Yongnian Zheng. (2004). *Sars Epidemic, The: Challenges To China's Crisis Management*. World Scientific.

Pannewick, B., Baier, C., Schwab, F., & Vonberg, R.-P. (2021). Infection control measures in nosocomial MRSA outbreaks—Results of a systematic analysis. *PLoS ONE*, *16*(4), 1–10. <https://doi.org/10.1371/journal.pone.0249837>

<https://www.merriam-webster.com/words-at-play/virus-vs-bacteria-difference>

https://cdn.shortpixel.ai/client/q_glossy,ret_img,w_736/https://vivadifferences.com/wp-content/uploads/2019/03/Capture-11.png