

The Bacteria Wars

*A study on the correlation between the presence of Staphylococcus Aureus
and Staphylococcus Pneumoniae*

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Ethical considerations (position TBD)

This study requires taking samples from live human subjects. This is a one-off sampling process: they are required only once. The results are then communicated to the subjects via e-mail or by being delivered a physical piece of paper. They are informed previously on the process they are going to go through, as well as the purpose of the experiment. Each subject must read and agree to two documents: an informed consent which explains everything about the experiment¹ and a GDPR notice which documents the use of their data as well as an expected timeline for data anonymisation and destruction². All participants were screened to be over the age of 16, in order to ease the process and require no previous authorisation by parental figures on data collection. The experimentation followed has no effect on the subjects, and they were monitored during the process in order for them not to feel any kind of stress.

Since bacteria were used, some aspects of the experiment must be clarified and discussed. Previously to starting the experiment, I read profusely the WHO's Laboratory Biosafety Manual and Associated Monographs (4th Edition) as to mitigate any possible risk. During the experimentation there were 0 accidents or incidents. All plates were accounted for and controlled closely. No person other than me was allowed to come in contact with a plate that had been cultivated or with the used cotton swabs that were in the process of being disinfected. The cultivated plates were considered Biosecurity Level 2. All possibly infected material was disposed of taking into account the risks that the bacteria in question posed, using bleach at 0.5%.

Before starting the experimentation, I had an interview with my coordinator in order to solidify the fact that there was no alternative to taking cutaneous samples from human beings, as well as a discussion on bacteria and the risks that this experiment implies.

¹Can be found at <https://biblio.peiphy.xyz/TDR-IC.pdf>

²Can be found at <https://biblio.peiphy.xyz/GDPR-notice.pdf>

Abstract

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1 Introduction

§1.1 An overview of the study

§1.2 Bacteria and bacterial infections

Bacteria are prokaryote organisms, generally single-celled, which are part of the Monera animal kingdom. Their sizes range from between 30 μm and 100 μm and are ubiquitous¹ organisms. This form of life is believed to be the first one to have ever appeared on Earth, as well as the one responsible for the oxygen-rich atmosphere the Earth currently has. Some species are hard to culture in a laboratory environment, but generally, those that can be cultured in a controlled environment are grown in agar plates[MicrobioMed].

Agar is used as a place to grow bacteria due to the fact that it is indigestible for the majority of bacteria, yet it keeps them humid and, together with growth mediums, such as Lysogeny Broth, bacteria thrive in this environment, allowing them to proliferate and create colonies, which can be seen to the naked eye. Sometimes, together with the growth medium, additives such as mannitol salt are added. These are used to improve or impede bacterial growth, modify their conditions so they develop differently or as an identification tool. For example, *Staphylococcus Aureus* ferments it, producing acid, which in turn decolorates the plate from red to yellow.

Pathogenic bacteria are bacteria that have the ability to cause disease². These are not the most common type of bacteria, as the majority of them are either harmless or beneficial to the human body through symbiosis, such as the bacteria that help with digestion in the stomach³.

¹Ubiquitous: found everywhere

²"A disease is a particular abnormal condition that negatively affects the structure or function of all or part of an organism, and that is not immediately due to any external injury."[dorlands:001]

³citation needed

§1.3 The enemy: *Staphylococcus aureus*

Staphylococcus Aureus (also known as Staph) is a GRAM-positive bacteria, the most virulent and studied of its genus⁴. Some of its distinctive characteristics include having a very thick glycopeptide wall, which allows it to withstand extreme temperatures and osmotic pressures, therefore rendering most classic methods of food conservation (such as cooking, smoking, freezing or salting⁵) completely useless against said bacteria; a protein A capsid, which binds to many eukaryote organism. It's an extremely resistant (and thus ubiquitous) bacteria. It can be found in human skin and mucotic surfaces (such as the mouth or the nose), as well as in certain foods such as ham (cooked or curated), eggs, raw and cooked dough, as well as in poultry. This is due to the fact that it has a large and thick glycopeptide capsule, which protects it from extreme temperatures as well as osmotic pressure. Thus, it can survive highly salty, extremely cold and extremely hot environments. [parts]

§1.4 The enemy's weapons

I'll write this back at the UDG library with the book I used to make that thing. If I can't, I will just find the scanned pages and work my way backwards from there.

§1.5 Our weapons

I'll write this back at the UDG library with the book I used to make that thing. If I can't, I will just find the scanned pages and work my way backwards from there.

⁴citation needed, got to check the proper terminology

⁵citation needed

I

Appendix

