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| **INTRODUCTION**  Humans are thought to be able to accomplish anything as long as they work together. They put a man on the moon, cloned animals, mapped the human genome, and even sent a rocket to Mars. However, there are still many mysterious things that humans cannot comprehend or figure out. The Ebola virus, Mad cow disease, Foot and hands disease, and HIV are a few diseases and viral infections that scientists cannot solve. Ebola is known to have an 88% fatality rate in Zaire and 55% fatality rate in Sudan. Those are very frightening statistics. Even though we are in the midst of scientific advancement, there are still some things that we cannot figure out. No matter how hard we humans try, we cannot rid the world of viruses or bacterium that cause illnesses in humans. But, as long as we are here on this planet, we will always try to find a cure in order to save an individual�s life.  **OUR BACTERIA: Bacillus cereus**  Bacillus Cereus is known to cause two distinct types of illnesses: one, a diarrheal illness with an incubation time of approximately 4 to 16 hours, and two, a vomiting illness with an incubation time of approximately 1 to 5 hours. Incubation is the time it takes for the bacteria to take effect. The vomiting illness strains are often associated with rice and other starchy food. The diarrhea illness is commonly associated with meats, fish, and vegetable. Symptoms can last up to 24 hours. It�s widely distributed in nature and in foods, and commonly found in soil, milk, cereal, starch, meat, and vegetable produces. Foods most often implicated in outbreaks include meats, pie, and fried rice (Bacillus Cereus, #19). All people are believed to be susceptible, or vulnerable, to Bacillus Cereus (so watch out!). Bacillus Cereus hasn�t been thought to be life-threatening until recently; there have been a strain of Bacillus Cereus able to produce enough toxins to cause liver failure. This prokaryote is so widespread, that it�s very difficult to keep it from contaminating food. Bacillus Cereus is able to produce spores that can survive dryness and mild heat treatments, such as cooking. Freshly cooked food eaten hot, and immediately after cooking is safe. Steaming under pressure, roasting, frying, and grilling are most likely to destroy the bacillus cell and it�s spores. However, temperatures under 212 F will allow the survival of some spores (Bacillus Cereus, #19).  **SULFUR: History**  In 2000 B.C., sulfur was used to bleach cotton and linen. Egyptian paintings as early as 1600 B.C. contained sulfur derived colors. We can conclude from this that sulfur has been used by people in their daily lives. Sulfur is referred to brimstone in the Bible and is the fuel in the fires of Hades. Sulfur was also used as a disinfectant in the time of Homer. It wasn�t recognized as an element until the 1800�s (Watt #1).  **SULFUR: Scientific Information**   |  |  | | --- | --- | | **NAME** Sulfur | **GROUP #** 16 | | **SYMBOL** S | **GROUP NAME** Chalcogen | | **ATOMIC WT** 32.066 | **PERIOD #** 3 | | **ATOMIC #** 16 | **BLOCK** p-block |   Sulfur is essential in all life forms including microorganisms, plants, and animals. It is a minor constitute of fats, body fluids, and skeletal minerals. Pure sulfur is tasteless, odorless, brittle-solid, that is pale yellow. It is a poor conductor of electricity and is insoluble in water. Sulfur exists in several different forms. The two most important forms are orthorhombic and monocline crystalline modifications. Sulfur burns easily and gives a blue flame and pungent fumes. It is known as an allotropic element and is a solid non-metal. Sulfur makes up 0.06% of the Lithosphere and 0.09% of water in the sea (Britannica, #5). Organic sulfur is a component of many living things; cabbages, turnips, mustard greens, onions and garlic are all high on sulfur (Lam, #11). Large amounts of the element associated with volcanic vents that are found in Japan and Chile. Smaller deposits are found in hot springs such as the Mammoth Hot Springs in Yellowstone Park. It is not normally necessary to make sulfur in a laboratory because it�s so readily available. It is found as a native element in nature and is extracted by the Frach process. This means that sulfur can be extracted from underground without mining for it. In the Frach process, the underground deposits are forced to the surface using super heated water and steam and compressed air. Purity of sulfur can reach up to 99.5% and the process is energy exhaustive (Watt, #1). Sulfur Dioxide is a dangerous component in atmospheric pollution and is one of the factors that cause acid rain (Encarta, #8).  **WHAT IS AN ANTIBACTERIAL?**  The ideal antibacterial compound displays a selective toxicity. This means that it is harmful to the microbe (bacteria or virus) without being harmful to the host (you). In reality, many antibacterials have a relative toxicity. Antimicrobial is a broader category that includes anti-fungal, anti-viral, anti-protozoal, or anti-bacterial compounds.  Antibacterial specifically act against bacterial cells (What is an Antibiotic?, #15). The actual mechanism of anti-bacterial components is not always known. In general term, most of these drugs act by altering or inhibiting one of the following structures or processes:  - cell wall synthesis  - permeability of the cell membrane  - protein synthesis  - nucleic acid synthesis  ([NEXT](http://docs.google.com/intro2.html))([Abstract](http://docs.google.com/abstract.html))([Acknowledgements](http://docs.google.com/acknowledgements.html))  [[Home](http://docs.google.com/home.html)][[Introduction](http://docs.google.com/introduction.html)][[Hypothesis](http://docs.google.com/hypothesis.html)][[Procedure](http://docs.google.com/procedure.html)][[Data](http://docs.google.com/data.html)][[Conclusions](http://docs.google.com/conclusions.html)][[Bilio/Links](http://docs.google.com/biblio.html)]  [[2001 Projects](http://docs.google.com/index.html)][[2000 Projects](http://docs.google.com/AP2000/index.html)][[1999 Projects](http://docs.google.com/AP99/index.html)][[1998 Projects](http://docs.google.com/AP98/index.html)] |