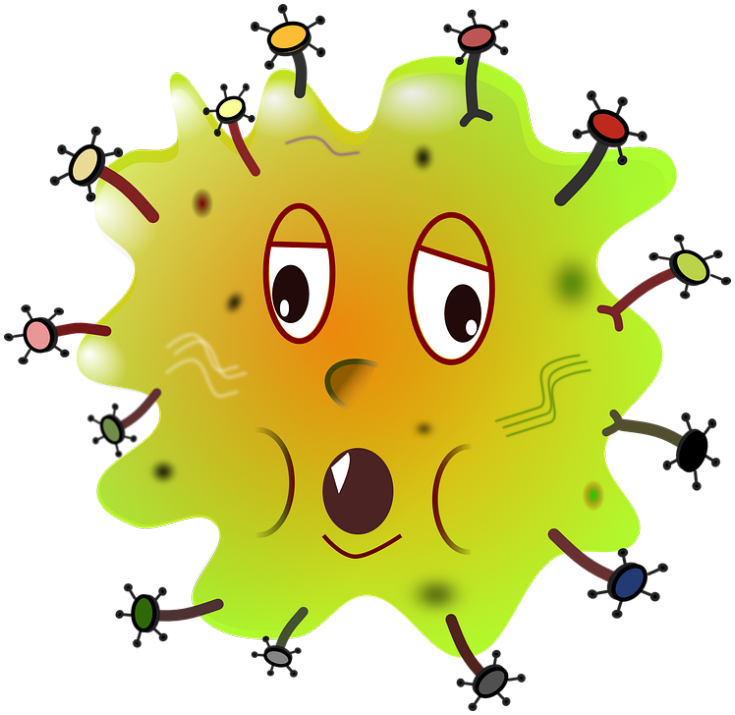
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A promising technology for killing microbes

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A team of researchers from Rutgers University has invented an inexpensive, effective way to kill bacteria and sanitize surfaces with devices made of paper.

They found out that by applying high voltage to stacked sheets of metallized paper, they were able to generate plasma, which is a combination of heat, ultraviolet radiation and ozone that kill microbes.

In the future, paper-based sanitizers may be suitable for clothing that sterilizes itself, devices that sanitize laboratory equipment and smart bandages to heal wounds, among other uses. The motivation for this study was to create personal protective equipment that might contain the spread of infectious diseases, such as the devastating 2014 outbreak of Ebola in West Africa.

The researchers' invention consists of paper with thin layers of aluminum and hexagon/honeycomb patterns that serve as electrodes to produce the plasma, or ionized gas. The fibrous and porous nature of the paper allows gas to permeate it, fueling the plasma and facilitating cooling.

In experiments, the paper-based sanitizers killed more than 99 percent of *Saccharomyces cerevisiae* (a yeast species) and more than 99.9 percent of *E. coli* bacteria cells. Preliminary results showed that these sanitizers could kill spores from bacteria, which are hard to kill using conventional sterilization methods.

The scientists will explore the design and fabrication of paper-based sensors for wearable devices capable of measuring brain waves and sweat to determine human alertness and stress.