

Antimicrobial Technology:

New solutions for protecting
employees, patients,
and customers

RAPID+
AID®

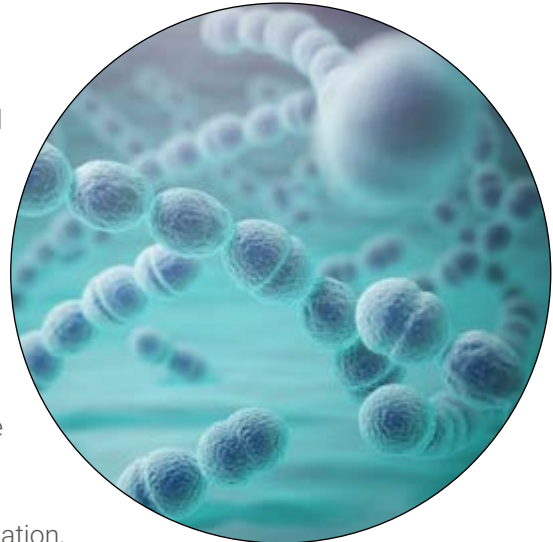
New solutions provide continuous protection against bacterial contamination, odors, and stains for the lifetime of products

WHAT IS ANTIMICROBIAL AND HOW IS IT DIFFERENT FROM ANTIBACTERIAL?

If you are not a scientist, you may not be aware of the difference between the things you use every day, like hand sanitizers, disinfectants, or antibiotics. Still, the distinction is significant based on their origin, use, regulation, or mode of action. In many cases, the two terms used interchangeably, thus the confusion.

Think of it like a cat and a tiger. Both are animals, mammals, and meat-eaters. But they are distinctive in that one is the more generic name of the two, and the other has a specific set of characteristics. Antimicrobial is the broader term used to define products that inhibit the growth or spread of microbes, or kill them. Antivirals, antibacterials, and antifungals are all antimicrobials that target a specific type of infectious microbe. The main difference is upon which they act.

- + **Antibacterials** include substances that may kill or suppress the growth or reproduction of bacteria...and only bacteria. Heat, radiation, chemicals such as chlorine, and antibiotic drugs all have antibacterial properties¹. Many of these products are used for cleaning and handwashing today, as well as antibiotics.
- + **Antifungals** are substances that may either kill the cells of a fungus or prevents the fungal cells from growing. Medications for those may include treatments for athlete's foot or a toenail fungus.
- + **Antivirals** are used in the treatment of viruses. Most target specific viruses, while broad-spectrum antivirals are effective against a wide variety of them. Unlike most antibiotics, antivirals do not destroy target pathogens; but instead, only inhibit their development.
- + **Antiparasitics** stop parasitic diseases, such as those caused by amoeba, ectoparasites, parasitic fungi, and protozoa, among others. Like antibiotics, antiparasitics target the parasitic agents of the infections and destroying them or stop their growth.



Below is a quick reference to the differences

ANTIMICROBIALS COVER ALL OF THESE

Type	Antibacterials / Germicides	Antivirals	Antifungals	Antiparasitics
What does it kill?	Bacteria	Viruses	Fungus	Parasitic Organisms
Examples	E Coli, [staphylococcus] aureus	Influenza, flu or hepatitis	Athlete's foot	Tapeworms in food or giardia in water

WHAT ARE ANTIMICROBIALS?

Now that you understand the difference between them, you can now move on to the genre of broad-spectrum technologies known as antimicrobials. Antimicrobial technologies integrate the benefits of antibacterials, antivirals, and antifungals by minimizing the presence of bacteria, mold, and fungi.

The primary classes of antimicrobial agents are

1. Disinfectants which are non-selective and kill a wide variety of microbes on non-living surfaces. Used to prevent the spread of illness, (such as bleach)
2. Antiseptics applied to living tissue help reduce infection during or after surgery
3. Antibiotics used to destroy microorganisms within the body.

Most of the above classes are used in medications, vaccines, or consumer goods, however, the newer class of antimicrobial agents are those that can be added to products during the manufacturing process. Adding them as a part of the material at a molecular level allows a new generation of products to have some or all of the above antimicrobial properties but on a semi-permanent basis. For example, when added to packaging or gel packs, manufacturers can control odor and staining caused by bacteria, mold and mildew growth. These antimicrobial additives help keep products fresher, cleaner and more durable.



THE DANGERS OF BACTERIAL GROWTH ON ICE PACKS

While most companies have a protocol for the safe handling of their products, there are many steps along the supply chain where contamination can occur. Cold packs should not be one of the risks.

Ice packs used for food transportation and home delivery

An April 9, 2020, report from the FDA on best practices in food delivery, provided guidance concerned with safe handling practices due to the Covid-19 outbreak². Washing hands, cleaning high-touch surfaces, designated pick up zones, and more influence the spread of bacteria. The guidance also recommends increasing the frequency of cleaning and disinfecting of high-touch surfaces, and routinely sanitizing coolers and insulated bags used to deliver meals. One method of assuring food safety is by using gel packs coated with antimicrobial substances. By using this specialized type of coolant packaging, cross-contamination caused by food handling can be minimized, even in the case of high-touch distribution chains.



surgery or injury causes a break in the skin barrier, it can potentially allow bacteria to enter and cause infection.”

Bacteria on the skin causes most wound infections, which is the most common problem that can occur post-surgery. Even one week after surgery, the tissue strength of the incision is only 10% of normal (50% after one month).

Thus, cold treatment may generally be used several weeks after surgery and require antimicrobial based solutions to prevent bacteria from growing and spreading from ice pack to skin. Note that not all cold packs are sterile, and therefore should not be used for surgical care or open wound therapy without first consulting with the manufacturer.

Heat treatments are typically prescribed for chronic injuries with some degree of residual pain, stiffness, and tension. Using a hot pack to improve circulation supports rapid tissue regeneration and healing of inflamed or stiff joints. It can also improve in the basal metabolism of tissues and help with the elasticity of inflamed or stiff joints.

Antimicrobial use with cold and hot packs used for injury and surgical procedures

Using ice as a treatment for surgical wounds or injuries, known as cryotherapy, is not new. Even when you were a child, your mom knew that cold decreases pain by reducing inflammation and swelling. Even in the old movies, you would see a guy with a black eye holding a piece of meat to his face to reduce the swelling.

Dr. Ken Dauber, Physical Medicine & Rehabilitation Specialist at the Plano Orthopedic & Sports Medicine Center, states,

“Cold lets more oxygen flow to cells, while at the same time, slows the metabolism of a cell, so less oxygen is required. It also makes the nerve endings less sensitive to the pain.” Dr. Dauber adds, “however, it is important to keep the site clean and protected as it heals. Since your skin is a natural barrier that keeps out germs (bacteria), it is natural that as



Pharmaceutical applications for antimicrobial gel packs and phase change materials

The pharmaceutical cold chain uses phase change panels and gel packs for maintaining the temperature of shipments while in transit. The focus of most antimicrobial solutions has traditionally been around the safety of the patient, however companies are concerned as well about their own employee safety as well.

Antimicrobials on the gel packs themselves helps prevent bacteria from being transferred from person to product, or product to person. Also, since refrigerants need to be USDA grade (non-toxic, environmentally friendly, and reusable), it also is beneficial for the outside of the gel pack to support these standards as well. Since the antimicrobial treatment is a physical layer of the gel pack itself, it will not “rub off” on the container or cause a reaction with the Styrofoam packaging.

ADVANCEMENTS IN ANTIMICROBIAL TECHNOLOGIES AND THEIR USE IN ACTIVE PACKAGING SOLUTIONS

Innovations in antimicrobial technologies have resulted in solutions that can go beyond medications and antiseptics. Certain types of substrates, including polymers (plastics) and textiles, have been developed with antimicrobial protection already included. Added at the point of manufacture, the application of the antimicrobial becomes a part of the molecular structure and will not wash off or wear away (as opposed to a spray-on disinfectant).

What this means is a new line of revolutionary solutions is available that do more than simply inhibit microbial growth. Even after repeated exposure to contagions, these products remain cleaner between cleanups and reduce the spread of bacteria on high-touch surfaces.

The best part about using a broad-spectrum treatment is instead of a single application, such as a spray or medication, use on a substrate continuously inhibits the growth of microbes on surfaces for long periods. In many cases over the entire lifetime of the product. This makes them perfect for use in hygiene-critical environments such as in healthcare, pharma or food.

SOLUTIONS ON THE MARKET TODAY

By adding a broad spectrum, poly layer antimicrobial finish to fibers and fabrics, Rapid Aid has developed a unique line of antimicrobial hot and cold solutions designed specifically for the needs of healthcare, pharmaceutical, and transportation markets.

The solution has been 3rd party tested for both single-use and reusable solutions. Adding this protection:

- + Keep products cleaner, fresher, and more durable for longer.
- + Provides long-lasting odor control
- + Protects your products from stain and odor
- + Reduces the risk of illness caused by bacteria, mold, and mildew
- + Are less likely to aid in the transfer of harmful microbes to another surfaces.

Today Rapid Aid has applied this technology to

- + instant cold products (direct and non-direct to skin),
- + instant warm products (both direct and non-direct to skin products),
- + hot and cold reusable gel compresses, and
- + transportation gel packs for use in pharmaceutical and food packaging.



CONCLUSION: TODAY'S SOLUTIONS. TRUE POTENTIAL.

Antimicrobial packaging is on the threshold of transforming the 'packaging industry.' Antimicrobial coatings and other treatments can be used on all sorts of products, from clothing to coolers. Its true potential, though, is only realized through collaborative endeavors from the fields of food technology, material science, engineering, & microbiology. As a leader in cold and warm technology for therapeutic, surgical, and transportation needs, Rapid Aid is at the forefront of the industry.

If you would like to learn more about Rapid Aid and their antimicrobial solutions, visit www.rapidaid.com/antimicrobial or contact us at info@rapidaid.com.

ABOUT RAPID AID

Since 1975, Rapid Aid has been the leading global developer and manufacturer of temperature-related solutions for the healthcare, transportation, food, and retail sectors. Our patented, proprietary products are designed specifically for the needs of each market. They include hot and cold therapy products for use in injury, comfort, or surgery and temperature-controlled solutions to maintain the integrity of products.

Whether looking for a private label or Rapid Aid branded solution, our solutions allow your company to be both innovative and cost-effective. Our head office is in Mississauga, Ontario, and we proudly produce over 400 products both in Canada and our wholly-owned manufacturing facilities in China and Vietnam.

For more information about **Rapid Aid**, visit our website at rapidaid.com

1 <https://www.medicinenet.com/script/main/art.asp?articlekey=10215>

2 <https://www.fda.gov/food/food-safety-during-emergencies/best-practices-retail-food-stores-restaurants-and-food-pick-up-delivery-services-during-covid-19#pickupdelivery> * <https://link.springer.com/article/10.1007/s13213-017-1311-1>

3 Tested materials include PE-- Poly, polyethylene, PA--Poly nylon, poly amid, and PET--Polyester, polyethylene terephthalate. Additional materials are in testing and will be available at a later date.

