

Amicoat AS

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Coating medical devices to fight infections

Amicoat's environmentally friendly antimicrobial coating technology has a broad spectrum of activity with a low risk of provoking antibiotic resistance. The peptide-based technology effectively eliminates biofilms and can be applied to a wide range of medical devices to reduce healthcare-associated infections.

Healthcare-associated infections (HAIs) pose a major risk to patients, especially in vulnerable and immunocompromised individuals, and this is accentuated in the context of the ongoing COVID-19 pandemic. In many cases HAIs are attributed to indwelling medical devices, such as wound dressings, catheters and intubation equipment.

Amicoat has developed a peptide-based antimicrobial coating (AMC) technology with activity against a broad range of pathogens. It can be applied to medical devices to reduce the incidence and complication of HAIs. "By integrating our AMC technology into their medical devices, original equipment manufacturers will be able to offer products with leading-edge properties to combat microbial infections, including those caused by antibiotic-resistant strains," said Georg Andreas Gundersen, CEO of Amicoat.

The patent-protected AMC technology offers several advantages compared with existing technologies such as silver- and antibiotic-based platforms. The active component, AMC-109, is highly effective at both eradicating and preventing biofilm and there is a low risk of bacteria developing resistance. The technology can be applied to a wide variety of surfaces and materials, e.g. polyurethane and silicone. It also has a benign environmental impact, degrading into simple amino acids.

Founded in 2014 in Tromsø, Norway, Amicoat is now entering into license agreements with original equipment manufacturers (OEMs) to use its AMC technology. Customers are supported throughout the product development process by the company's expert interdisciplinary team.

Rapid antimicrobial action

AMC-109 is a small synthetic antimicrobial peptide developed through extensive research on the antimicrobial properties of lactoferricin, a host-defense peptide fragment that can be found in humans and other mammals. Amicoat's scientists have harnessed certain characteristics of the peptide to improve it and make it suitable for application on different types of materials and devices.

The mechanism of action for AMC-109 is lysis of bacterial membranes—it attaches to the outer cell membrane of a bacterial cell and causes it to rupture and die rapidly (Fig. 1). "It's a brute force mechanism because our peptide pokes holes in the cell and then it dies, unlike most antibiotics, which act from inside the bacterial cell," said Gundersen. As a result, AMC-109 has a very rapid effect, which also means that cells have no time to defend themselves or to build up resistance.

AMC-109 has demonstrated efficacy against a wide range of organisms, including Gram-positive

How AMC-109 works

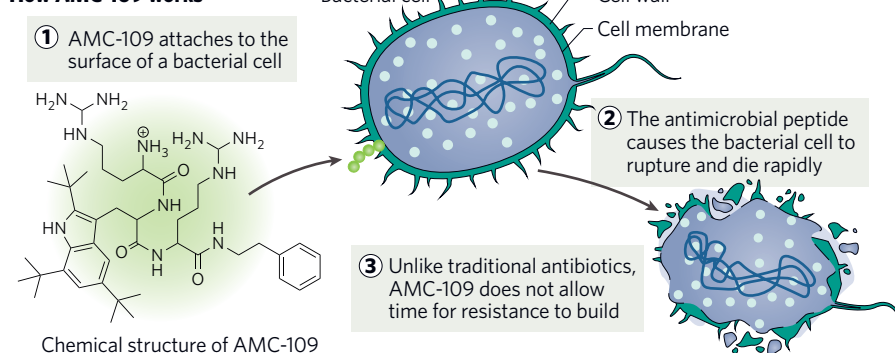


Fig. 1 | AMC-109 has rapid antibacterial action. Bacterial cells have no time to defend themselves or to build up resistance to AMC-109. In contrast, most antibiotics act more slowly from inside the cell, which allows more opportunities for resistance to develop.

bacteria, Gram-negative bacteria and some fungi. It is also effective against antibiotic-resistant strains, such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE) and multi-resistant *Pseudomonas* isolates.

The manufacture of AMC-109 has been optimized and represents a scalable current good manufacturing practice (cGMP) process with defined lead times.

Versatile coating technology

The AMC technology can cover a wide variety of shapes and surfaces, and is compatible with a range of different materials, including fibers, metals and different types of plastics in common use in the medical device industry.

It is also possible to control how tightly the peptide is attached to a medical device. For example, a fairly loose attachment of short duration may be required when using AMC-109 with a wound care product. "We have found that bandages containing AMC-109 work most effectively if the peptide can leak out into the wound itself to do its magic, so they can be designed to last until the bandage is due to be changed," said Gundersen.

For longer-term uses, such as orthopedic implants or synthetic heart valves, it is possible to couple AMC-109 to a surface more permanently through a cycloaddition ('Click') reaction. This single-step technology can be performed without harming either the solid support or the peptide. "As a result, the peptide is very tightly bonded chemically to the surface, which makes it much more resistant and prolongs the effect of coating the surface," said Gundersen.

Licensing opportunities

Amicoat sells commercial license rights to its AMC technology for use in specific products and offers a collaborative partnership throughout the product development and regulatory process. The company has already validated a strong demand for its antimicrobial coating technology from leading medical device manufacturers operating in an antimicrobial coating market of \$5.5 billion that is growing quickly.

Each medical device using Amicoat's technology is required to go through a separate regulatory process. "Whether we collaborate on wound bandages, orthopedic implants or pacemakers, each product would have its own regulatory pathway that would need to be cleared," said Gundersen. "This is a very niche area and we have a lot of technology expertise to offer that can add value to our partners during the development stages." This includes a technical dossier for the active component, which has previously been tested in clinical studies.

Amicoat is committed to creating long-term value in an environmentally responsible manner for all its stakeholders—customers, the products they make and the patients who may enjoy better health by avoiding HAIs. "We truly believe our company can have a significant impact in improving and saving lives," said Gundersen.

CONTACT

Georg Andreas Gundersen, CEO
Amicoat AS
Oslo, Norway
Tel: +47 95 99 66 98
Email: georg.andreas.gundersen@amicoat.com