Antibiotics play a key role in the prevention and treatment of periprosthetic infections

During surgery, contamination of the surgical site can always occur despite compliance with strict hygiene rules. Contamination may turn into an infection if the immune system is not able to clear the responsible pathogens. In the presence of easy-to-colonise, non-vascularised foreign bodies, such as implants, only few bacteria are sufficient to establish a joint infection.

Antibiotics in prophylaxis and therapy

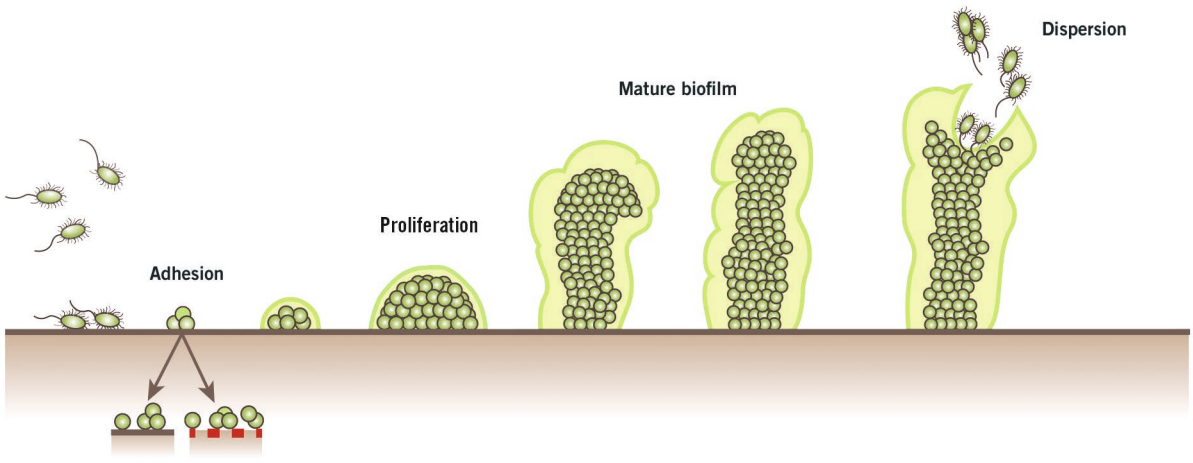
To lower the risk of a periprosthetic infection, antibiotics are used prophylactically in addition to stringent hygiene measures. They help the body to fight possible pathogens and prevent the development of infections. In the case of existing infections, antibiotics are intended to drastically lower the bacterial count after surgical debridement of the infected tissue and possible removal of the prosthesis.

In prophylaxis, antibiotics are generally used empirically, that is, on the basis of the suspected or most likely pathogens that cause periprosthetic infections. In the case of therapy, antibiotics are applied specifically on the basis of the known pathogen and its antibiogram. Bactericidal antibiotics that have a rapid onset of action and actively kill existing bacteria are preferred.

Antibiotics and biofilms

Bacteria have developed an efficient survival strategy in that they form biofilms. They are embedded in a slimy layer made of extracellular polysaccharides, proteins, lipids and DNA to form a complex, gel-like matrix. As part of this process, the bacteria change their metabolism from planktonic to sessile, which lowers their metabolic activity. This means that they become difficult to access from outside. They can remain in this stage for a long time so that they can later actively return to their planktonic, metabolically active state.

For surgical procedures in arthroplasty, it is therefore important to prevent bacteria from forming a biofilm as effectively and early as possible. This can be done by using antibiotic concentrations that are high enough to inhibit the growth of the bacteria so that the immune system is able to fight the bacteria.



Development phases of biofilms

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