



# Biofilms In Ear infections

**A biofilm** is a thin layer of microbial slime and proteins adhering to a surface. Biofilm forms when bacterial cells adhere to a surface and produce a matrix of extracellular polymeric substances (EPS), a sticky, glue-like material. The bacteria remain embedded within the EPS, which protects them

Bacteria and fungi are present naturally in the air and water. This can attach to damp surfaces and multiply to form a visible black slime or stain in various colors - black, red, and pink. These growths are known as **biofilms or microbial slime**. This is most noticeable in bathrooms and kitchens

## What are the stages of biofilm formation?

There are five stages of biofilm development. They are:

- Initial attachment.
- Irreversible attachment.
- Maturation I.
- Maturation II.
- Dispersion.

The biofilm infection life cycle generally follows the steps of attachment (interaction between bacteria and the implant), accumulation (interactions between bacterial cells), maturation (formation of a viable 3D structure), and dispersion or detachment (release from the biofilm).

## Why is biofilm so dangerous?

Inside biofilms, bacteria can communicate, live, feed, and grow. Bacteria are typically 200 times harder to kill with antibiotics or disinfectants inside a biofilm. While they are alive, they remain a threat to patients. The bacteria will continue to grow until the biofilm is disturbed or the released bacteria are transferred to other surfaces by hands, gloves, cleaning cloths, or other materials.

Only highly effective systems and products can assist with the removal of biofilms and kill harmful bacteria and other microorganisms.



### **Biofilms and health hazards**

One common example of biofilms in the human body is the dental plaque. They form a yellow coating on your teeth and cannot be easily removed.

**Biofilms and ear infections** - Studies have shown biofilm formation in a chronic middle ear infection and in the mastoid. These biofilms are difficult to treat and contribute to recurrent ear infections. Similar implants used in the ear like grommets, ossicular prostheses, and cochlear implants have also shown biofilm formation

### **How to treat Biofilms in the ear?**

The treatment of biofilms is tricky. As antibiotics are less effective here, mechanical removal of the slime/plaque is important. Similar to this, tympanoplasty ( ear surgery to close the perforation ) is done to remove the biofilms and enhance healing thereby preventing recurrent infections

- Dr. Prashanth R Reddy

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