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**Biomaterials with biodegradable polymer and antibiotics – efficiency tests in laboratories, practical use, advantages and disadvantages**

I.Skadins[1], J.Kroica[1], I.Salma[2], A.Reinis[1], M.Sokolova[2], D.Rostoka[1], N.Berza[1]

[1]Biology and Microbiology, Riga Stradins University, Riga, Latvia; [2]Biomaterial Innovation and Development Centre, Riga Technical University, Riga, Latvia

Infections continue to spread in all fields of medicine related to the implantation of biomaterials. The most frequent bacteria are *S.aureus*, coagulase-negative staphylococci and other agents of nosocomial infections. Biomaterial-associated infection is a significant clinical problem caused by the adhesion of bacteria and development of biofilm.

One of the ways to protect patients from biomaterial-associated infections would be the use of local antibiotics immediately after the implantation of biomaterial. Antibiotics are significant components for the treatment and prevention of biomaterial-associated infections. To serve this purpose, various biologically degradable polymeric biomaterials have been investigated with an aim to ensure local release of antibiotics. Controlled-release polymeric implants have a potential to reach high concentration of local antibiotics.

The local application of drug delivery systems in the field of bone infections is therefore beneficial due to such poor accessibility for systemically administered drugs. Antibiotics can be delivered locally, conventionally with use of impregnated cement beads, spacers, or pre-moulded implants or via appropriate drug delivery systems.

The antibacterial activity of functionalized biomaterials with antibiotics and biodegradable polymer can be tested by disk–agar diffusion test (also called Kirby–Bauer method), which is classic laboratory method for testing antimicrobial susceptibility of antibiotics. This method is well documented, and standard zones of inhibition have been determined for susceptible and resistant values.

The antibacterial activity functionalized biomaterials with antibiotics and biodegradable polymer also can be estimated in the experiment similar to in vitro drug release tests. When biomaterial samples are placed in 0.5 MacFarland bacterial suspension. The experiment is performed until the day when bacterial growth appeared in the medium.