Editorial corner – a personal view

Development of antimicrobial polymers by incorporation of bacteriophages

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Bacterial adhesion and proliferation on the surface of materials is a current cause of severe health and environmental problems. Bacteria can be organized in colonies with functional heterogeneity, forming biofilms where microorganisms can survive for long periods of time, especially in hospital environments. *Staphylococcus aureus* is probably the most dangerous type of bacteria associated with hospital infections since some strains become drug-resistant. In this sense, the use of natural agents like phages is receiving increasing attention. Phage therapy was developed in the Soviet Union. At present, the main research center is located at the George Eliava Institute in Tbilisi, Georgia. The extensive use of phages demonstrated their great specificity and efficacy in lysing targeted pathogens, as well as high ability to be quickly modified through natural selection and act against newly arising bacteria threads. Biotechnological companies around the world continue exploring the potentiality of phage therapy since it can find a niche in the Western medicine. However, regulatory and manufacturing practices, as well as profits, are yet not well-established, and consequently great difficulties exist in commercializing products. In this sense, academic centers should play a fundamental role.

PhagoBioDerm is an example of a commercial product that is highly efficient in treating patients with venous stasis ulcers, in promoting the healing of wounds or even prevention of infections (DOI: [10.1046/j.1365-4362.2002.01451.x](https://doi.org/10.1046/j.1365-4362.2002.01451.x)).

Different methodologies have been proposed to incorporate phages into a polymer surface. For example, plasma treatment functionalizes inert polymers like polyethylene with COOH groups at which phages could be covalently anchored while retaining their activity (DOI: [10.1021/bm400290u](https://doi.org/10.1021/bm400290u)). Efforts are also focused on incorporating phages into electrospun scaffolds because of their wide use in tissue engineering. Chemical attachment onto microfiber surfaces, adsorption on scaffold surfaces (e.g. by using cationic biodegradable polymers such as poly(ester amide)s based on arginine amino acid (DOI: [10.1021/bm5005977](https://doi.org/10.1021/bm5005977))) and encapsulation of phages during electrospinning are methodologies that are being developed. In the last case, it should be guaranteed that activity will not be lost as a consequence of the high applied electric field or the use of an organic solvent. Dual, coaxial and miniemulsion electrospinning may allow the use of an aqueous environment to protect phages, becoming suitable methods with a great potential for phage therapy.

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