44. Title: Antimicrobial coating against implant infection

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Key words: Antimicrobial coating, Implant-related infection

Domain: Material Science

Summary: A biodegradable 3D printed polymeric implant is developed, which is modified with anti-infective polymer brushes. The implant itself is fabricated from a blend of completely biodegradable polyesters, i.e., polyester of tartaric acid - a natural acid found in tomatoes, grapes and raw mangoes and polylactic acid originated from corn starch. Using the polyester as a scaffold, infection resistant polymer brushes are chemically bonded to its surface. The surface tethered brushes, fabricated from poly[(2-methacryloyloxyethyl] trimethyl ammonium chloride) (PMETA), are of nanometre dimensions, which possess antibacterial activity. An evaluation of antibacterial activity and cytocompatibility revealed that the composition of the brush not only inhibits bacterial growth but also offers a stable, non-leaching, anti-infective, cyto-compatible coating on the surface of the implant. Further, the brushes also offer a physical barrier to the microbial cells, discouraging their colonization on the surface of the medical implant for prolonged period of time.

Advantages:

- This method provides stable, non-leaching, infection resistant, and highly cyto-compatible (non-toxic) coating
- It avoids the risk of infection caused by bacterial growth onto the surface of implant
- It stops the growth of disease-causing micro-organisms
- It is simple, non-toxic, more secure and long-term solution

Applications: Biomedical implant industries

Scale of Development: The developed infection resistant polymeric coatings on polymeric scaffold/ implants were fabricated at lab scale and have been tested for in vitro studies.

Technology Readiness Level: 4

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