The Torch
Vol. 2 (46)

Fabrics to discourage microbial transmission

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Studies have proven that the fabrics which we use in our day to day life play the main role in adherence and transmission of microorganisms, including pathogenic microbes that may cause infectious diseases, especially in hospital environments. These pathogens mainly include bacteria and viruses. It should be noted that the outer envelope of viruses is made up of proteins and some viruses such as coronavirus have an additional lipid bilayer. Hence, fabrics with protein repulsion can help in decreasing the adhesion of viruses and other microbes to the fabrics. Fabric can be made protein repellent by improving the hydrophilicity of the surface. Hydrophilicity refers to the affinity of a substance towards water molecules. The hydrophilicity is increased by using polyethylene glycol which is a polymeric biomaterial. Its hydrophilic polymer chains can form a hydration layer by forming hydrogen bonds with water. Therefore, the sustainability of the layer is maintained by hydration pressure, resulting in a barrier for protein adsorption. Hence, protein resistance is achieved as the entropic energy is too high for the proteins to cross the hydrophilic polymer chains which form the hydration layer, thereby lowering the ability of proteins to adhere to the surface of the fabric.

Keywords: Proteins, Viruses, Pathogen adhesion, Polyethylene glycol, Hydrophilicity, Polymeric biomaterials

Citation:
Renisha Robinson. Fabrics to discourage microbial transmission. The Torch. 2021. 2(46). Available from:
https://www.styvalley.com/pub/magazines/torch/read/fabrics-to-discourage-microbial-transmission.