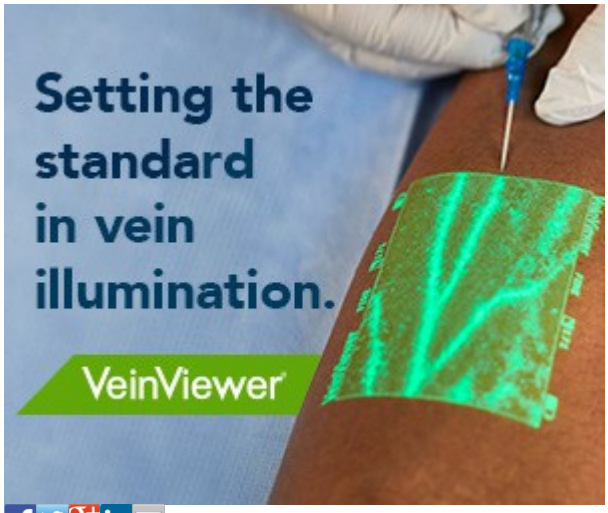

The different requirements set to biomaterials implants and devices in different clinical applications call for tailor-made strategies. Here, a modular coating-concept for biomaterials is reported, which in its full, trifunctional form comprises nonadhesiveness to bacteria and antimicrobial release, combined with enhanced tissue integration characteristics" Sjollema et al (2016).

Abstract:

Various potential anti-infection strategies can be thought of for biomaterial implants and devices. Permanent, tissue-integrated implants such as artificial joint prostheses require a different anti-infection strategy than, for instance, removable urinary catheters. The different requirements set to biomaterials implants and devices in different clinical applications call for tailor-made strategies. Here, a modular coating-concept for biomaterials is reported, which in its full, trifunctional form comprises nonadhesiveness to bacteria and antimicrobial release, combined with enhanced tissue integration characteristics.

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Nonadhesiveness to proteins and bacteria is accomplished by a hydrophilic brush coating

(Vitrostealth). The antimicrobial release module is constituted by a chlorhexidine releasing poly(ethylene glycol) diacrylamide based-coating that continues to release its antimicrobial content also when underneath the nonadhesive top-coating. The third module, enhancing tissue integration, is realized by the incorporation of the penta-peptide Glycine-Arginine-Glycine-Aspartic acid-Serine (GRGDS) within the nonadhesive top-coating. Modules function in concert or independently of each other. Specifically, tissue integration by the GRGDS-module does not affect the nonadhesiveness of the Vitrostealth-module toward bovine serum albumin and Staphylococcus aureus, while the antimicrobial release module does not affect tissue-integration by the GRGDS-module. Uniquely, using this modular system, tailor-made anti-infection strategies can thus readily be made for biomaterials in different clinical applications.

Reference:

Sjollema, J., Keul, H., van der Mei, H., Dijkstra, R., Rustema-Abbing, M., de Vries J., Loontjens, T., Dirks, T. and Busscher, H. (2016) A Trifunctional, Modular Biomaterial Coating: Nonadhesive to Bacteria, Chlorhexidine-Releasing and Tissue-Integrating. Macromolecular Bioscience. October 19th. .

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