MODIFYING CELL ADHESION TO POLYURETHANE LEAD INSULATION

Mike Ebert, Rick McVenes, Ken Stokes, Janelle Thompson, Bob Ward, Jacqueline Jones, Jasmine Patel, Jim Anderson, Medtronic, Inc., Minneapolis, MN, USA, The Polymer Technology Group, Inc., Berkeley, CA, USA, Departments of Biomedical Engineering and Pathology, Case Western Reserve University, Cleveland, OH, USA

A polyether polyurethane similar to Pellethane 80A (Elasthane™) was modified by covalently attaching a different polymer to its reactive endgroup forming a surface modifying endgroup (SME). The SME’s migrate to the surface of the tubing forming a coating while the bulk polymer is Elasthane. Since the SME is also contained in the bulk, should any SME be removed from the surface, it will be immediately replaced. We have tested fluorocarbon (F), polyethylene oxide (P), and silicone (S) endgroups in human dermal fibroblast and Staphylococcus epidermidis cell cultures to evaluate cell adhesion. The bacterial adhesion was performed under various shear stresses to simulate different flow regimes within the body. The fibroblast culture results (repeated in triplicate) showed that the SME’s inhibited cell adhesion and proliferation compared to the Elasthane 80A control. The bacterial test results (repeated in triplicate) demonstrated that the SME materials had significantly lower adhesion than the Pellethane 80A control. These results indicate that it may be possible to control cell adhesion to the surface of lead insulation reducing bacterial adhesion and adhesion to the surrounding tissue.