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Investigation of Biological Adhesives and Polyurea Crosslinked Silica-Based Aerogels LAURA LYONS, Univ. of Memphis, Dept. of Physics, MEAGAN CAUBLE, Univ. of Georgia, Dept. of Chemistry, JUDITH COLE, Univ. of Memphis, Dept. of Biology, FIROUZEH SABRI, Univ. of Memphis, Dept. of Physics — One of the key steps towards developing new technology for nerve repair is to look at the interaction mechanism and strength of biological components with the material under investigation. The existing technology for peripheral nerve repair relies on suturing techniques for attaching and immobilization of the implant. It is also limited to connecting two nerve components only, through a cylindrical-shaped unit which we will refer to as 1-D. The focus of our work is to develop an aerogel-based printed circuit board (PCB) system for precise guidance of multiple (n-D) neuronal components, simultaneously. Here we report on the adhesion strength of sciatic nerve segments removed from cadaver Sprague Dawley rats and the surface of treated and untreated polyurea cross-linked silica-based aerogels. The adhesion strength of the nerve to the aerogel surface was studied under varying environmental conditions as well as surface coating types. The coatings tested were basement membrane extract (BME), Cell Tak, and the combination. Since the mechanism of adhesion to cells and other surfaces is different and non-competing for BME and Cell Tak it is expected that a stronger adhesion should be accomplished by combining these two adhesives. The effect of temperature, nerve elasticity, and ionic concentration on the strength of adhesion was investigated also and will be reported.

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