Smart and Biocompatible Ostomy Bag Hydrogel Adhesive

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Ostomies are digestive and excretory surgeries where waste is redirected to the abdomen, requiring a bag to catch excretion into a bag; current methods have adhesives along with pastes or powders to create adhesion for 24 hour storage of the ostomy bag. However, current adhesives are weak, leading to leakages of wastes which cause painful skin damage, like dermatitis. No methods today have strong adhesion and leak detection to prevent skin damage for ostomy bags. Hydrogels are the perfect candidate due to its biocompatibility and mechanical strength. In this work, we introduce the hydrogel ostomy adhesive (HOA) made from the polymer polyacrylamide (AAm) that can be adhered onto the skin for up to 3 days, detect a leak as it happens, and maintain strength for bodily motions. Adhesion is created with a modified method of using the biopolymer chitosan and crosslinkers N-hydroxysuccinimide (NHS) and 1-Ethyl-3-(3-dimethylaminopropyl)carbodiimide (EDC). In vitro and ex vivo on porcine skin results show strong adhesion compared to many products today and quick detection. The HOA may bring ostomy patients longer wear time, cheaper costs, and a better quality of life.

Awards Won: