

## MSN-embedded dopamine-based hydrogel patch for wound healing and drug delivery

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Mussel-inspired dopamine-based adhesive hydrogel is well known as a promising material for many applications. The catechol group of dopamine has a strong adhesive property on various surfaces such as metal, nonmetal, organic polymer, and inorganic materials, and the adhesive strength of the hydrogel can be maintained after repeated adhesions. In addition, the dopamine-based hydrogel has an adhesion in a wet environment. However, the conventional single network dopamine-based hydrogel is suffered from its low mechanical properties. In this study, we propose the extra-large pore mesoporous silica nanoparticle (XL-MSN) as a nanofiller in hydrogels to enhance mechanical properties by entangling nanoparticles between polydopamine/polyacrylamide (PDA/ PAM) chains. As a result, the cohesiveness of the gel was increased and the adhesion was improved. Also, XL-MSNs with bigger pores than conventional MSNs can be applied to drug delivery system by loading more drugs than conventional MSNs for wound healing. This drug delivery hydrogel patch is expected to be applicable as a wound dressing or transdermal patch.