

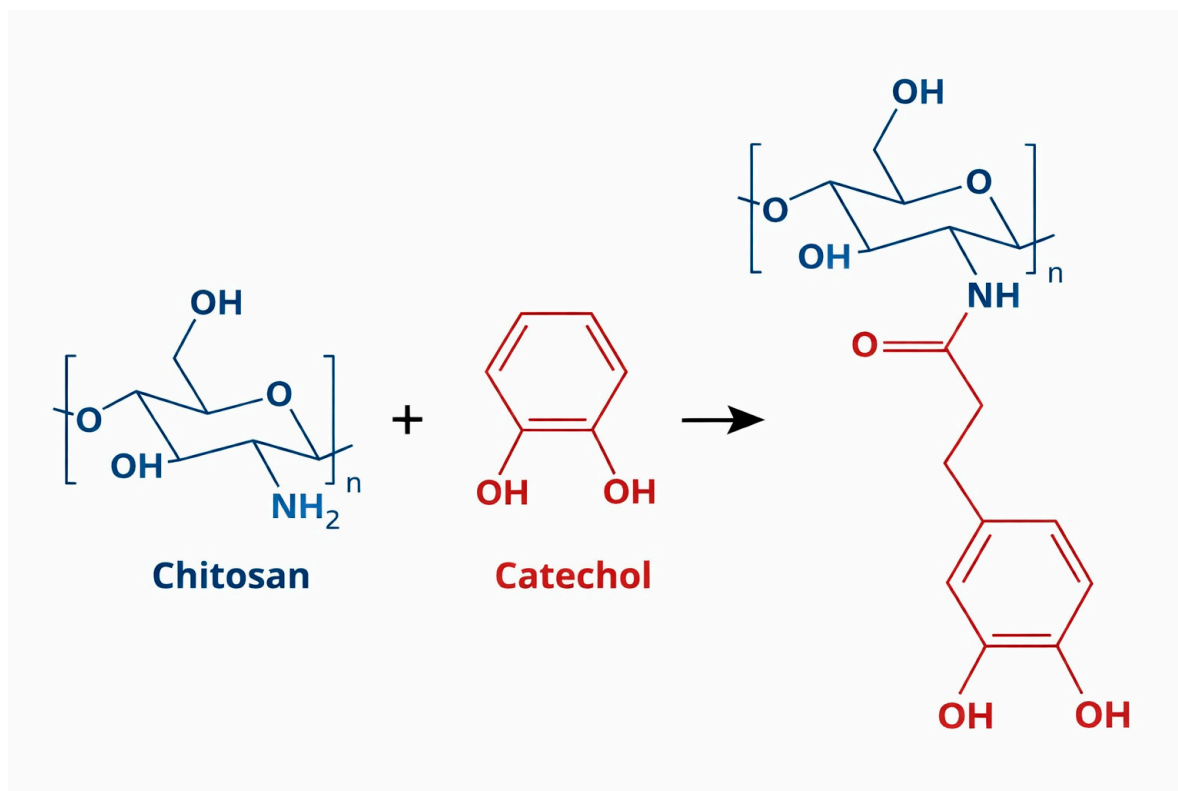


Figure S1. Schematic representation of catechol-functionalized chitosan (catechol–chitosan). Catechol moieties are covalently grafted onto the chitosan backbone via amide bond formation.

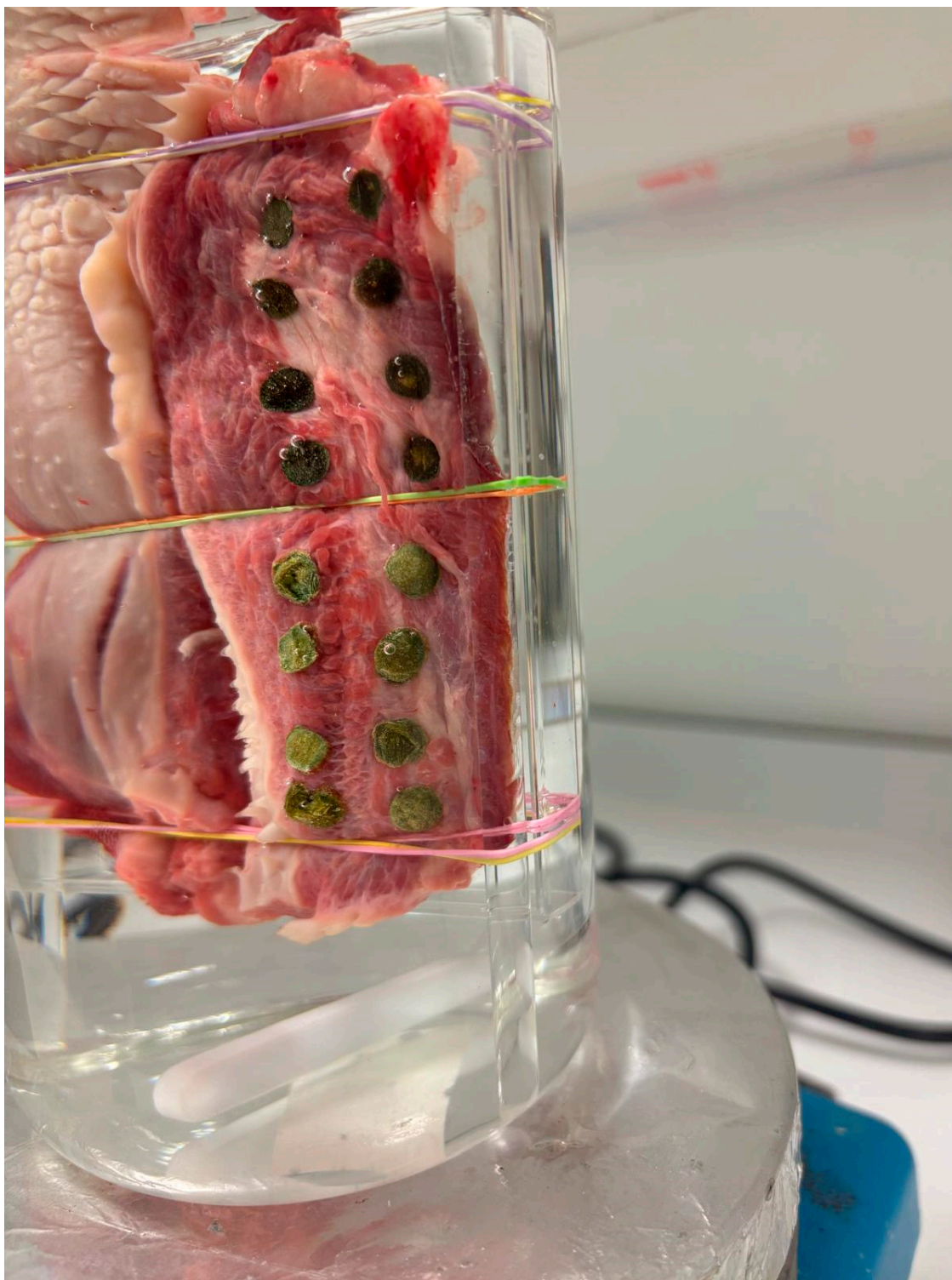


Figure S2. Representative image of the ex vivo tissue–hydrogel assembly used in the mucoadhesion test.

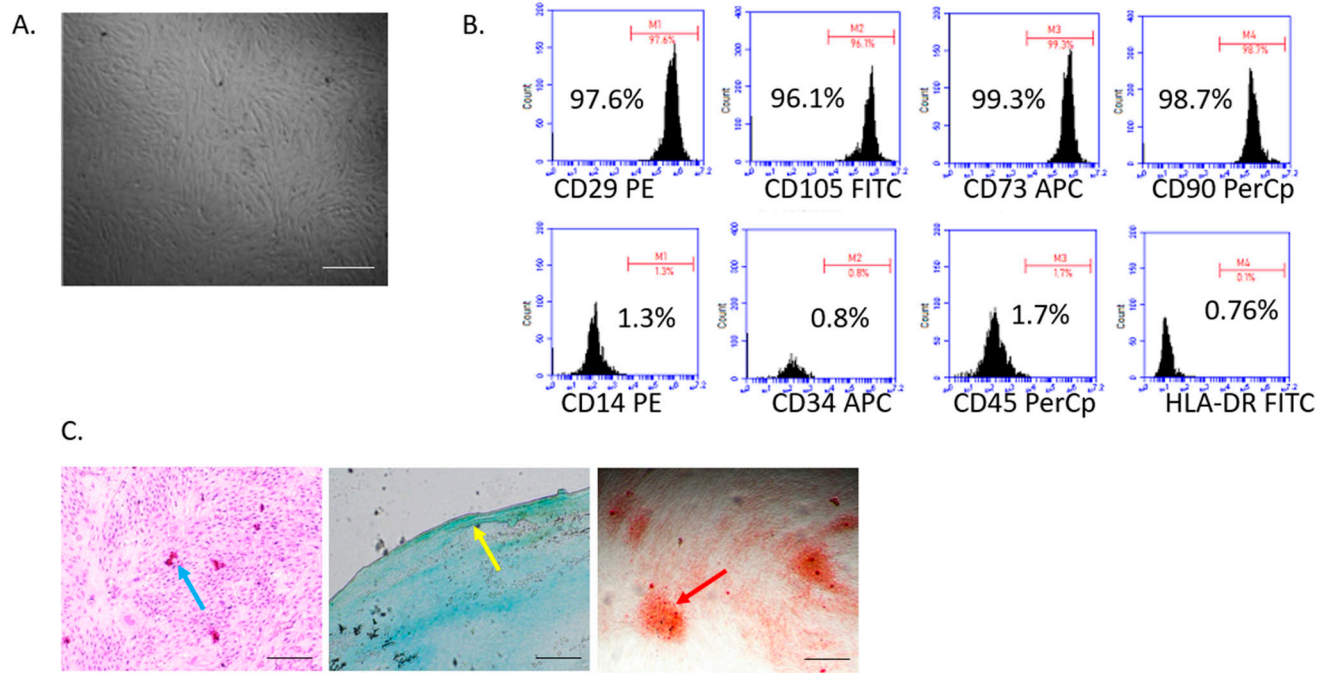


Figure S3. The characterization analyses of DFMSCs. (A) Inverted microscope image of DFMSCs at the third passage. The cells have a fibroblast-like morphology at the bottom of the culture flask. (B) Flow cytometry analysis of DFMSCs in the third passage for positive and negative markers. DFMSCs have fluorescent intensity over 95% for positive markers (CD29, CD73, CD90, CD105), and lack the expression of negative markers (CD14, CD34, CD45, HLA-DR). (C) Differentiation ability of DFMSCs at the third passage. DFMSCs are capable of differentiating into osteogenic cells, chondrocytes, and fat cells. Calcium deposits stain orange after Alizarin Red staining (red arrow). Proteoglycans and cartilage stain blue after Alcian Blue staining (yellow arrow). Oil droplets appear red/purple after Oil Red O staining (blue arrow).

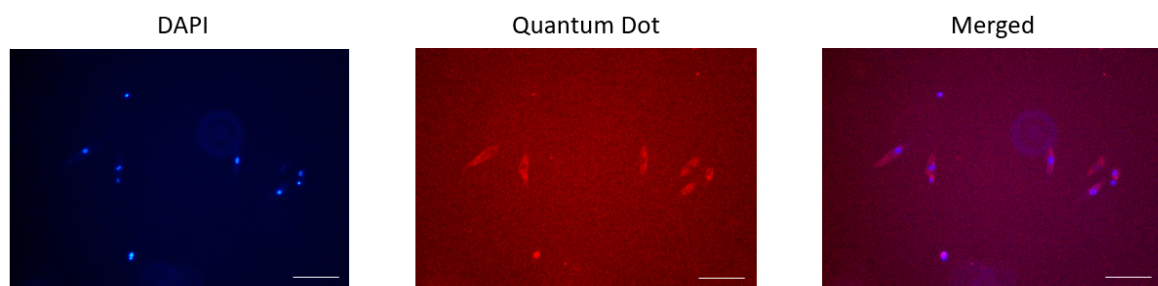


Figure S4. Fluorescence microscope image of DFMSCs labeled with quantum dot (Qdot) nanoparticles. The cells had approximately 60% fluorescence intensity after Qdot labeling. DAPI staining was performed after culturing the cells. The merged image shows cells stained with DAPI and Qdot.

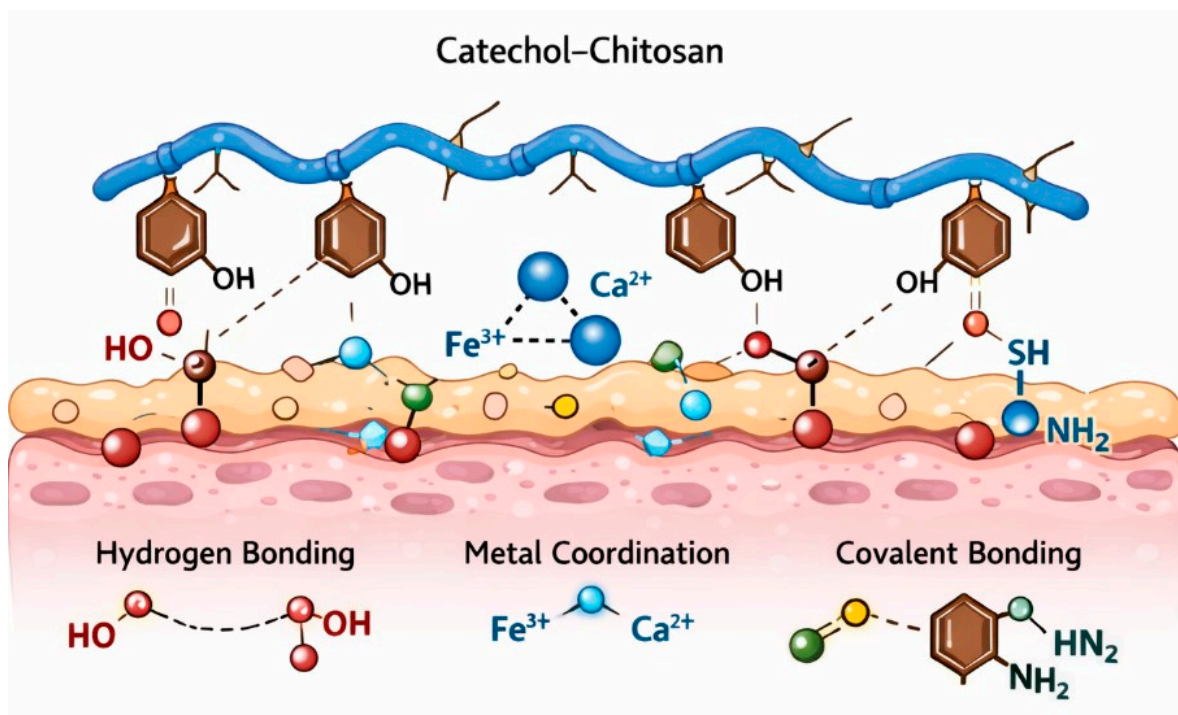


Figure S5. Schematic illustration of catechol-mediated mucoadhesion.