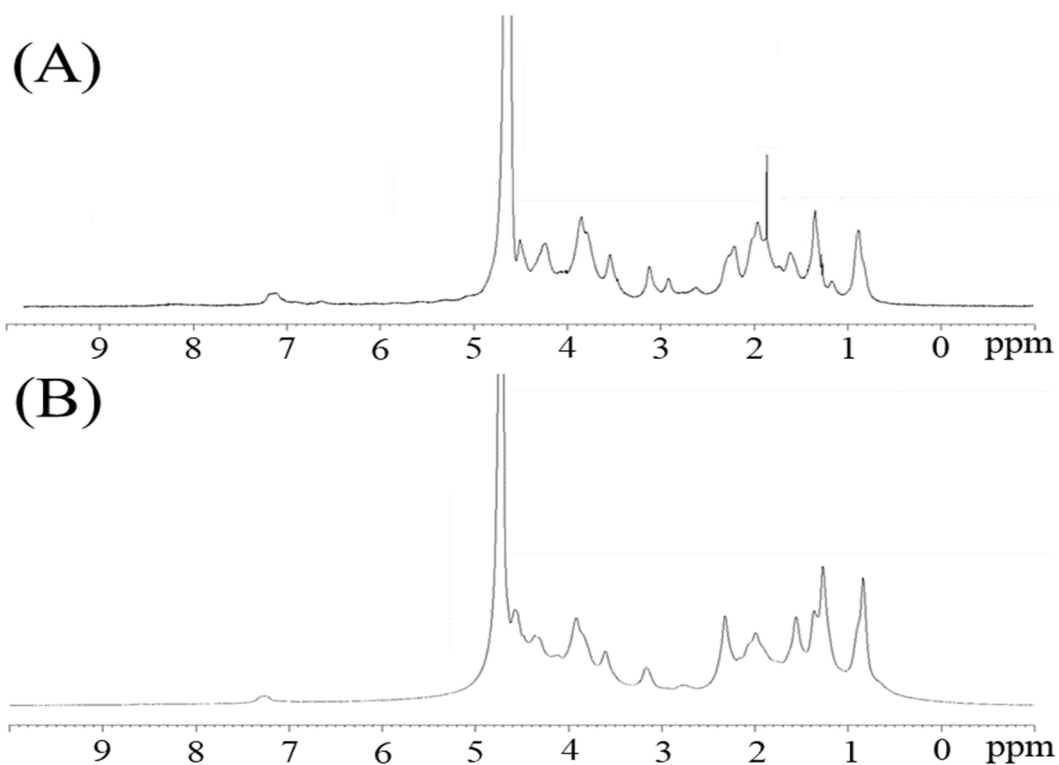


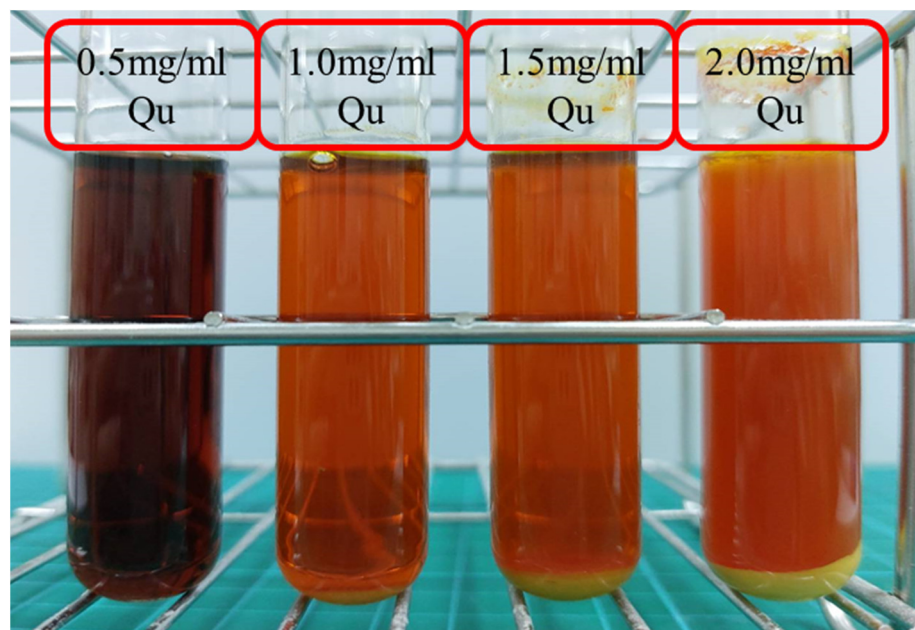
## Supplementary data

**Table S1.** Primers used in this study.

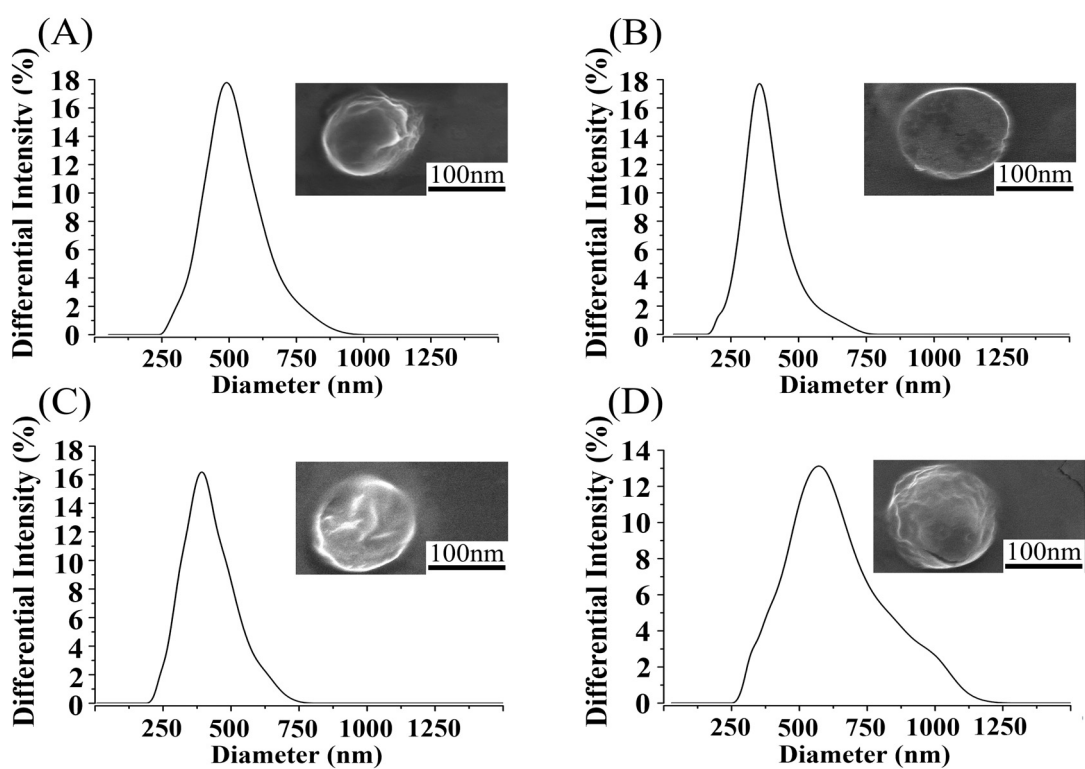
Marker gene		Sequences (5'-3')	Accession No.
<i>Gapdh</i>	Forward	GACTCCACTCACGGCAAATTCAAC	XM_036165840
	Reverse	GTCGTGGAGTCTACTGGTGTCTTCAC	
<i>Col I</i>	Forward	CCCAGTGGCGGTTATGACTTCA	NM_007742
	Reverse	CACCACCCTCAAGAGCCTGAGT	
<i>TGF-<math>\beta</math>1</i>	Forward	GAGCCACTGCCCATCGTCTACTAC	NM_011577
	Reverse	GCTACCATGCCAACTTCTGTCTGG	
<i>Col III</i>	Forward	TTCATGAAGATGACCGACGA	NM_009930
	Reverse	GTCCAGTCGTAGCCCTTGAG	
<i>TIMP-1</i>	Forward	CCTTCTGCAACTCGGACCTGGTC	NM_001044384
	Reverse	GCTATCACTGATAGCTTCCAG	
<i>MMP-2</i>	Forward	GAGCATGGAGATGGATACC	NM_008610
	Reverse	GTATGGAGCGACGTCACTCC	



**Figure S1.** <sup>1</sup>H-NMR spectrum of gelatin molecules in D<sub>2</sub>O: (A) primitive and (B) modified gelatin molecules.



**Figure S2.** Appearance of QAGN with loading different concentrations of quercetin, in deionized water.



**Figure S3.** Particle size and SEM image of QAGNs with various concentrations of quercetin. (A) 0.5mg/ml quercetin loaded QAGNs; (B) 1mg/ml quercetin loaded QAGNs; (C) 1.5mg/ml quercetin loaded QAGNs; (D) quercetin loaded QAGNs.

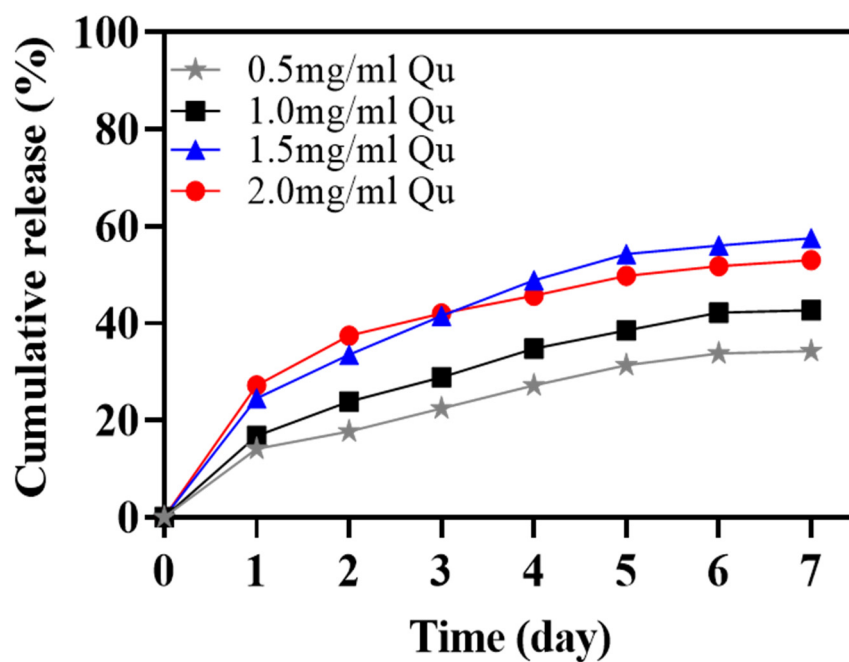


Figure S4. Drug releasing profiles of Qu in QAGNs.

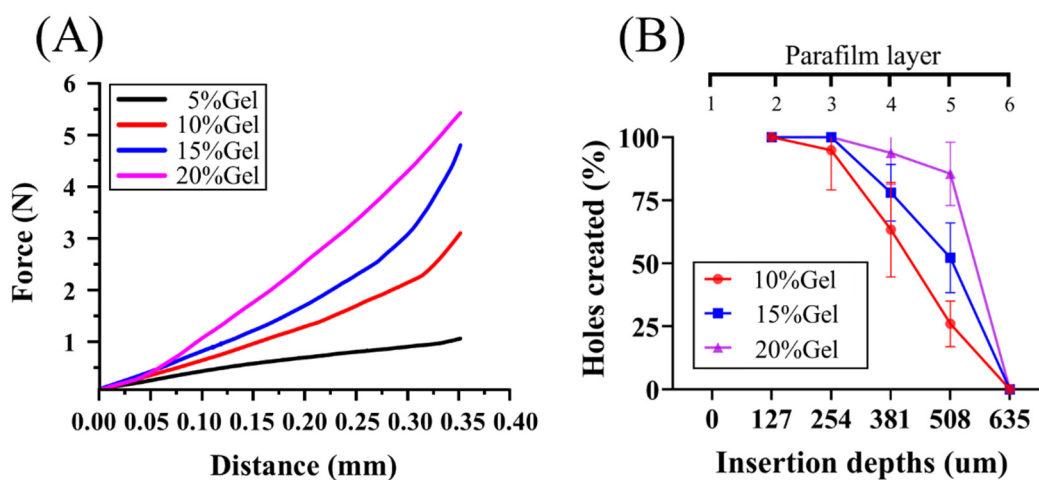


Figure S5. (A) Mechanical properties analysis of composite MN patches with various concentrations of gelatin; (B) Insertion in parafilm.