Development and application of a transdermal device derived from carboxymethyl cellulose and acid functionalized carbon nanotube

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To overcome the problems associated with conventional polymer hydrogel in transdermal drug delivery like limited penetration ability and poor stability, herein, for the first we report a new generation of hydrogel nanocomposite based on carboxy functionalised multiwalled carbon nanotube and carboxymethyl cellulose [1-3].

The developed nanocomposite hydrogel is well characterized and found to be biocompatible (Figure 1 and 2).

Finally the composite demonstrates excellent potential towards sustained release of transdermal drug – diclofenac sodium (Figure 3).

Figure 1: (a) FESEM, (b) 2D topographic, (c) 3-D topographic and (d) TEM images of CMC-MWCNT nanocomposite

Figure 2: (a) Cell viability result, (b) cell proliferation result of control and CMC-MWCNT nanocomposite study by MTT assay (SD $\pm$ 3), and (c), (d) cellular attachment of RFBs by rhodamine-phalloidin and DAPI assay at different time periods

Figure 3: Diclofenac release from (a) CMC and various nanocomposites and (b) stability study of drug loaded CMC and best grade of CMC-MWCNT nanocomposite for 3 months

References

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